The Iowa Returns Level Signal, Read as the Cycle-Contrarian Anchor

Why the Iowa State University producer-margin series behaves empirically as a cycle-contrarian lens at the sixty-day horizon, and the ten-percentage-point spread between the Liquidation tail and the Strong-Profit tail.

David Stendahl · Market Lab Analytics · October 28, 2026

What this signal is

Iowa State University's Department of Economics publishes the net return per market hog for a representative Iowa farrow-to-finish operation, monthly, four to six weeks after each month's end. The same series anchors two Lean Hogs specialists in this complex, read through two different mechanistic lenses.

This signal reads the net-return series directly as a level z-score (not sign-flipped). The engine declaration is `composite_direction: AS_IS` with the mechanistic intent of reading "strong producer margins = constructive forward through confidence and absorption of future supply." A composite above plus 0.5 means producer margins have been running two standard deviations above the trailing-two-year norm. A composite below minus 0.5 means they have been running 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 0.0482 at p = 4.80e-06 across 8,986 trading days. The negative IC is critical: the signal's mechanistic intent (strong margins supportive forward) is not what the data shows at the sixty-day horizon. The empirical direction is cycle-contrarian: Strong-Profit regimes empirically precede forward Lean Hogs weakness as the industry caps the cycle; Liquidation regimes empirically precede forward strength as the supply response delivers.

The Liquidation tail (composite below minus 0.5), 877 state-days, delivered a mean forward-60-day Lean Hogs return of plus 8.92 percent, roughly 8.5 points above the plus 0.41 percent baseline. The Strong-Profit tail (composite above plus 0.5), 1,040 state-days, delivered mean minus 1.25 percent, 1.7 points below baseline.

On December 2, 2020, as Iowa producer margins had been pressured for nine months on the COVID packer-shutdown dislocation, the composite entered the Liquidation tail at minus 0.517 with Lean

Hogs at 67.88 cents per pound. Over the next 60 trading days, Lean Hogs rallied 21.97 percent to 82.80 by early February 2021. On May 4, 2020, in the middle of the April 2020 packer-shutdown dislocation when cutout had spiked but live hog prices had collapsed, the composite entered the MODERATE_POS band at plus 0.550 (a brief, atypical margin spike inside a crisis) with Lean Hogs at 65.50. Over the next 60 trading days, Lean Hogs fell 32.01 percent to 44.55. On April 2, 2019, as Iowa margins had expanded through late 2018 on the pre-ASF export anticipation, the composite entered Strong-Profit at plus 0.977 with Lean Hogs at 91.50. Over the next 60 trading days, Lean Hogs fell 19.72 percent to 73.44.

Here is the twist. The engine's mechanistic intent was "margin-level reader at the near-term horizon." The empirical data at the sixty-day horizon says the signal functions as a cycle-contrarian anchor roughly identical in content (but opposite in sign) to its sibling Z3294 margin-pressure reader. The two signals share the same source and the same construction; they should NOT both receive equal weight in a composite. This brief documents the empirical mismatch and the resolution path.

Read on.

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How the inputs compose

See the Iowa Producer Returns Margin brief for the full anatomy of the Iowa State University series (same source, same column, same monthly cadence). The construction difference versus Z3294 is one line of Python: Z3294 applies `val = tanh(-z)` (negative-sign on the z-score, mapping negative returns to positive composite); Z4762 applies `val = tanh(z)` directly (no sign flip, mapping positive returns to positive composite).

The engine's rationale for the dual construction: the Iowa series carries two mechanisms at different horizons. In the near term (sixty-day), strong margins coincide with strong Lean Hogs futures because both move with wholesale pork cutout. Over the longer term (twelve-month-plus), strong margins forecast capacity expansion decisions that cap the cycle. The dual signal was built to read each mechanism on its intended horizon.

The empirical outcome: at the sixty-day forward horizon, Z4762 does NOT deliver on its stated mechanism. The IC runs negative (minus 0.048), meaning Z4762 behaves at the sixty-day horizon like a mirrored Z3294. Strong margins empirically precede forward Lean Hogs weakness, not strength. The two-year z-score window compresses too many cycle phases into a single rolling baseline, so the signal cannot cleanly separate "near-term margin reward" from "longer-term cycle-cap."

The reader-facing interpretation of this signal uses the empirical direction. Readers who treat Z4762 as a cycle-contrarian anchor (Liquidation bullish, Strong-Profit bearish) are consistent with the measured Spearman IC. Readers who treat the engine's declared "margin reward" semantic literally will see counter-direction outcomes on average.

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: December 2, 2020. The on-mechanism cycle-trough reward.

Firing date: the composite entered the Liquidation tail at minus 0.517 on December 2, 2020. Lean Hogs front-month close: 67.88. Forward 60-day return: plus 21.97 percent. Lean Hogs rallied to 82.80 by early February 2021.

Iowa producer margins had been pressured starting April 2020 as COVID-driven packer-plant shutdowns collapsed cash hog prices while the market absorbed a backed-up pipeline. Through Q2-Q3 2020, the industry worked through the backlog at distressed margins. By December 2020, the breeding herd had contracted on margin stress and the forward slaughter book was tightening.

The Liquidation tail reading at minus 0.517 flagged the cycle-trough regime. The forward sixty days delivered the biological supply response: Q1 2021 futures priced the forward tightness, and Lean Hogs rallied 22 percent. On-mechanism for the cycle-contrarian empirical direction.

Lesson: deeply negative margins sustained over multiple quarters trigger the biological supply response, and the forward curve prices it. The signal catches this cycle-trough regime cleanly when margins stay compressed long enough to force breeding decisions.

Case 2: April 2, 2019. The on-mechanism cycle-cap case.

Firing date: the composite entered Strong-Profit at plus 0.977 (near-saturated) on April 2, 2019. Lean Hogs front-month close: 91.50. Forward 60-day return: minus 19.72 percent. Lean Hogs fell to 73.44 by early June 2019.

Iowa producer margins had expanded through late 2018 and into 2019 on the China African Swine Fever export anticipation. Producer expansion decisions accelerated. The Strong-Profit near-saturated reading flagged the cycle-cap regime.

Through April and May 2019, the China ASF export tempo partially disappointed. The forward slaughter book was already loaded. Cash cutout softened. Front-month futures tracked lower. The signal's cycle-cap mechanism delivered on-direction empirically (even though the engine's declared direction labels this case as "near-term bullish on strong margins," which it was NOT on the forward sixty-day window).

Lesson: the saturated Strong-Profit tail catches the cycle-cap regime where producer margins have expanded fast enough to pull expansion decisions forward. The forward curve prices the eventual supply response. On-direction for the cycle-contrarian empirical interpretation.

Case 3: February 2, 2021. The paradox counter-case.

Firing date: the composite entered Strong-Profit at plus 0.570 on February 2, 2021. Lean Hogs front-month close: 78.08. Forward 60-day return: plus 44.31 percent. Lean Hogs rallied to 112.68 by early April 2021.

The Q1 2021 Lean Hogs rally and the Iowa producer margin recovery ran together as the breeding-herd contraction from mid-2020 began to tighten the forward slaughter book. Margins recovered because futures rallied; futures rallied because supply was tightening. The Strong-Profit reading at plus 0.570 flagged (per engine declaration) "near-term bullish margin reward" , and in this case the market actually delivered the near-term bullish outcome, counter to the empirical cycle-contrarian pattern.

Lesson: in rally regimes driven by sustained demand (not supply dislocation), margins and futures run together without the cycle-cap mechanism firing on the first sixty days. The signal mis-fires on structurally bullish demand regimes. Readers should pair this signal with cutout-direction reads (Z3481, Z4738) to filter: if cutout is softening, the Strong-Profit tail is on-direction (bearish forward); if cutout is sustained-strong, the Strong-Profit tail can run with the rally.

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What the state-conditional returns have actually done

> **Reference baseline (8,986 Lean Hogs trading days, 1990 to 2026)**
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> 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 Strong-Profit state (composite above plus 0.5), 1,040 trading days, delivered mean minus 1.25 percent, median minus 2.18 percent. That is minus 1.65 percentage points below the baseline mean. Percent negative 56.2 percent, 6.4 points worse than baseline. The band's conditional read is bearish-forward, which contradicts the engine's declared "near-term bullish" semantic.

The MODERATE_POS state (composite plus 0.2 to plus 0.5), 208 trading days, delivered mean minus 1.53 percent, median minus 3.55 percent. The band sits below baseline, consistent with the cycle-contrarian pattern.

The Baseline state (composite minus 0.2 to plus 0.2), 6,522 trading days, delivered mean minus 0.13 percent, median minus 0.15 percent. The band dominates the sample at 73 percent and sits essentially flat.

The MODERATE_NEG state (composite minus 0.5 to minus 0.2), 339 trading days, delivered mean minus 8.94 percent, median minus 8.18 percent. This is the deepest NEGATIVE conditional band in the full six-signal batch (minus 9.35 percentage points below baseline, 77.3 percent negative). The pattern reflects a "margins compressing but cutout softening together" twilight zone that empirically delivers the worst sixty-day forward returns.

The Liquidation state (composite below minus 0.5), 877 trading days, delivered mean plus 8.92 percent, median plus 5.79 percent. That is plus 8.52 percentage points above the baseline mean. Percent negative 36.0 percent, 13.8 points better than baseline. This is the single strongest conditional edge of the six-signal batch.

> **State-conditional returns summary (Lean Hogs forward 60-day)**
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> Strong-Profit, N=1,040, mean minus 1.25 percent (minus 1.65 pp below baseline). MODERATE_POS, N=208, mean minus 1.53 percent (minus 1.94 pp below baseline). Baseline, N=6,522, mean plus 2.31 percent, median plus 3.13 percent (minus 0.54 pp below baseline). MODERATE_NEG, N=339, mean minus 8.94 percent (minus 9.35 pp below baseline , the deepest negative band in the Lean Hogs stack). Liquidation, N=877, mean plus 8.92 percent (plus 8.52 pp above baseline , the strongest positive band in the Lean Hogs stack). Spearman IC rho equals minus 0.0482 at p equals 4.80e-06 across 8,986 trading days.

The 10.17 percentage point tail-to-tail spread is substantial. The signal's empirical structure is cycle-contrarian: Liquidation bullish forward, Strong-Profit bearish forward, with the Moderate-Compression mid-band delivering the worst forward returns (the deepest in the full LH complex).

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How to use the signal today

The current composite reads minus 0.33 (MODERATE_NEG). Iowa producer margins have run below the trailing-two-year mean through 2026 but not deeply enough to flip into the saturated Liquidation tail.

For a reader asking what the margin-level signal is saying about the next two months: the MODERATE_NEG band is empirically the single most-negative conditional read in the Lean Hogs complex (mean forward 60-day minus 8.94 percent, 77 percent negative). The current state is cautionary.

Pair the current reading with the Iowa Producer Returns Margin brief (same source, opposite construction), the breeding-herd signal, and the cutout signal. If the margin series moves deeper into the Liquidation tail by the November or December 2026 monthly print, the composite will flip to the Liquidation-reward regime and the sixty-day forward empirical read will become supportive. If margins recover, the signal drifts back toward Baseline.

For sizing: given this signal's near-redundancy with Z3294 (same source, inverted sign), the Lean Hogs composite should NOT weight both equally. Priya's recommendation is to drop Z4762 from the composite OR reweight at 0.25 to 0.33 of Z3294′s weight. The Y1068 ML Proposed composite already drops Z4762 in favor of Z3294 to avoid the double-count.

The next Iowa State University monthly margin report is scheduled for mid-November 2026 (October data).

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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 0.0482 at p equals 4.80e-06 across 8,986 observable trading days. The in-estate Iowa farrow-finish returns series carries 135 monthly 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 (near-term).` is empirically contradicted by the measured IC of minus 0.048 (p = 5e-06). The signal functions empirically as a cycle-contrarian lens at the sixty-day horizon. The engine's declared mechanistic intent (near-term margin reward) does not materialize in the data; instead, the signal reads the longer-horizon cycle-cap-and-reward mechanism inverted onto the sixty-day window. Reader-facing semantics use the empirical direction (Liquidation bullish

forward, Strong-Profit bearish forward). The engine label is retained for upstream ML composite compatibility.

Z3294 (Iowa Producer Returns Margin, sign-flipped version of the same source) carries IC rho = plus 0.0800 at p = 9.45e-14. The two signals are near-perfect mirrors in content; one carries a positive IC on the mechanism-matched reading, the other carries a negative IC on the empirical-match reading. In composite construction, they should NOT both be weighted equally.

The 504-day z-score window captures roughly two years of trailing history. The 60-day minimum population ensures the composite does not fire on insufficient history. A longer z-window (1,260 days, approximately five years) might better capture the cycle-horizon mechanism the engine intends.

Three complete Liquidation episodes anchor the constructive-tail (empirical) calibration: December 2020 (forward 60-day plus 21.97 percent), April 2020 (minus 20.33 percent, counter-case), December 2019 (minus 20.81 percent, counter-case). Three Strong-Profit episodes anchor the opposite tail: April 2019 (minus 19.72 percent), February 2021 (plus 44.31 percent, counter-case), March 2024 (minus 11.99 percent, on-direction).

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What this signal does not cover

Five caveats on the signal's reach.

First, the engine's declared polarity direction is empirically backwards at the sixty-day horizon. The engine declares `semantic_positive: Bullish LH (near-term).` with `composite_direction: AS_IS`; the measured Spearman IC is minus 0.0482. The signal reads empirically as a cycle-contrarian, not a near-term margin-reward. Readers who treat the engine's declared semantic literally will see counter-direction outcomes on average.

Second, the signal is near-redundant with Z3294 (Iowa Producer Returns Margin). Both read the same monthly Iowa State University series with construction differing only in sign-handling. The Lean Hogs composite should NOT weight both equally. The Y1068 ML Proposed composite correctly drops Z4762 in favor of Z3294.

Third, the signal mis-fires during structurally bullish demand regimes. The February 2021 Strong-Profit entry delivered plus 44 percent forward (counter-direction) because margins and futures ran together in the sustained post-COVID rally. Readers should pair with cutout-direction signals to filter.

Fourth, the two-year z-score window compresses too many cycle phases into a single rolling baseline. The engine's mechanistic intent (near-term margin reward) might materialize cleaner on a longer baseline (five-year window). This is a candidate for engine rebuild.

Fifth, the monthly cadence lag plus the thin-slice-of-industry limitation (independent-producer bias documented in the Iowa Producer Returns Margin brief) apply equally here.

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The Iowa returns level signal functions empirically as a cycle-contrarian anchor at the sixty-day forward horizon. The Liquidation tail has delivered plus 8.52 percentage points above baseline forward-60-day across 877 state-days; the Strong-Profit tail has delivered minus 1.65 percentage points

below baseline across 1,040 state-days. The deepest NEGATIVE band is the MODERATE_NEG mid-tail at minus 9.35 points below baseline.

The current reading sits in the mid-NEG band, which the empirical data flags as the Lean Hogs stack's single most-negative conditional read.

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