The Iowa Producer Margin Signal, Read as Supply Response Nine Months Forward

Why deeply negative Iowa farrow-to-finish margins forecast Lean Hogs rallies at the two-month horizon, and the ten-percentage-point tail-to-tail spread anchored on Iowa State University's monthly series.

David Stendahl · Market Lab Analytics · October 28, 2026

What this signal is

Iowa State University's Department of Economics publishes a monthly spreadsheet with one number that matters: the net return per market hog for a representative Iowa farrow-to-finish operation. The number subtracts corn, soybean meal, non-feed variable costs, labor, and interest from the realized carcass receipts, leaving dollars per head of economic profit or loss.

The signal reads this net-return series, z-scores it over roughly two years of trailing history with a 63-day minimum window, applies a sign flip so negative returns map to a positive composite, and bounds with tanh. A composite above plus 0.5 means producer margins have been running two standard deviations below the trailing norm (a Liquidation-Pressure regime). A composite below minus 0.5 means they have been running two standard deviations above (a Strong-Profit regime).

Over the full 1992 to 2026 window joined through the Lean Hogs reference asset, the signal's Spearman information coefficient against forward-60-day Lean Hogs returns is plus 0.0800 at p = 9.45e-14 across 8,646 trading days. The Liquidation-Pressure tail (composite above plus 0.5) delivered a mean forward-60-day Lean Hogs return of plus 8.43 percent across 873 state-days, roughly eight percentage points above the plus 0.41 percent baseline, with only 39.4 percent of state-days closing negative versus 49.8 percent baseline. The Strong-Profit tail delivered minus 1.86 percent across 1,068 state-days, 2.3 points below baseline.

On December 2, 2020, as Iowa producer margins had been crushed for nine months starting with the April 2020 USDA-reported packer-plant shutdowns, the composite crossed plus 0.5 into Liquidation-Pressure at plus 0.547 with Lean Hogs at 67.88 cents per pound. Over the next 60 trading days, Lean Hogs rallied 21.97 percent to 82.80 cents by early February 2021. On December 2, 2021, as margins stayed thin despite the 2021 rally and the industry entered a slow herd-contraction phase, the composite re-entered Liquidation-Pressure at plus 0.540 with Lean Hogs at 82.00. Over the next 60 trading days, Lean Hogs rallied 19.73 percent to 98.18. On April 2, 2019, as Iowa margins had expanded on the 2019 export rally and producers were adding capacity, the composite entered Strong-Profit at

minus 0.863 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 signal's engine notes contain a documented practitioner critique: the Iowa series captures margin for independent producers who negotiate in the daily spot market, not for the top-four vertically integrated systems (which run on contract placements against barn space, not price). The empirical plus 0.08 Spearman IC is weaker than the catalog's cited plus 0.321, because the signal reads a thin slice of the industry, roughly 30 to 40 percent of weekly kill. It is a real signal with a real mechanism, but it is a slice of the industry, not the whole industry.

This brief documents the signal's edge, the three signature cases, the state-conditional evidence, and the five caveats that mark the limits of the lens.

Read on.

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How the inputs compose

Iowa State University publishes the Estimated Returns from Farrow-Finish Operations series monthly, four to six weeks after each month's end. The input data is Iowa-focused: regional hog carcass prices from USDA Agricultural Marketing Service, corn and soybean meal costs from Iowa cash markets, non-feed variable costs including energy and animal health, and the standard producer-cost stack for labor and interest.

In the modern era (post-2015), Iowa farrow-finish returns have ranged from minus 80 dollars per head during deep bust phases (2018 trade war trough, 2023 cost squeeze, 2020 packer-shutdown backup) to plus 50 dollars per head during peaks (2020 export surge, 2022 cutout highs). The series mean sits near zero with heavy right-skew; margin shocks are more common and sharper than margin blessings.

The signal pulls the series, forward-fills the monthly observations to daily frequency, z-scores over 504 trading days (approximately two years) with a 63-day minimum, applies a sign flip (`val = -z`), and bounds with tanh.

The sign flip is the mechanism-encoding step. Deeply negative producer returns persisting for three to six months force herd contraction (producers can't sustain losses indefinitely; breeding stock gets culled, replacement decisions get delayed). The breeding-herd contraction tightens finished-hog supply nine to twelve months forward through the biological lag. The signal reads the economic pressure at the point of liquidation, not the biological response that follows.

Four confirming features run alongside the primary composite: 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 clean post-COVID liquidation-reward case.

Firing date: the composite crossed plus 0.5 into Liquidation-Pressure at plus 0.547 on December 2, 2020. Lean Hogs front-month close: 67.88 cents per pound. Forward 60-day return: plus 21.97 percent. Lean Hogs rallied from 67.88 to 82.80 by early February 2021.

Iowa producer margins had been crushed starting in April 2020 as COVID-driven packer-plant shutdowns backed up market-weight hogs on farms. Producers who could not move animals had to ship whatever would fit through reduced-capacity plants at distressed prices. Breeding herd contraction accelerated through Q3-Q4 2020 on margin stress. By December, the industry was in the clearest cycle-trough signal in a decade.

The Q1 2021 and Q2 2021 Lean Hogs rally was the biological response: the breeding stock reductions in mid-2020 showed up as finished-hog scarcity nine to twelve months forward. The signal's December 2020 Liquidation-Pressure entry delivered on-mechanism.

Lesson: deeply negative margins sustained over multiple quarters trigger the biological supply response. The sixty-day forward return catches the futures market's pricing of that anticipated response. The 2020-2021 cycle is the cleanest in-sample demonstration.

Case 2: December 2, 2021. The structural tightening confirmation.

Firing date: the composite entered Liquidation-Pressure at plus 0.540 on December 2, 2021. Lean Hogs front-month close: 82.00. Forward 60-day return: plus 19.73 percent. Lean Hogs rallied to 98.18 by early February 2022.

Despite the 2021 Lean Hogs rally, Iowa producer margins stayed thin through 2021 on elevated feed costs. The industry was in a slow herd-contraction phase. The December 2021 Liquidation-Pressure entry reflected the sustained margin pressure. Over the following 60 trading days, feed-cost inflation accelerated into the February 2022 geopolitical shock, further compressing margins; but by that point, the forward supply response was already pricing on the futures curve.

Lesson: the second-order mechanism is thin margins keeping producers from expanding capacity. Even without explicit herd liquidation, sustained margin thinness quietly erodes the breeding herd through delayed replacement decisions. The signal catches this slow drift along with the acute liquidation episodes.

Case 3: April 2, 2019. The clean cycle-cap case.

Firing date: the composite entered Strong-Profit at minus 0.863 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 as the pork complex rallied on expected African Swine Fever export demand from China. By March 2019, margins were sitting well above the trailing-two-year norm. Producer expansion decisions accelerated. The Strong-Profit tail reading flagged "profit regime, expect supply response, bearish forward."

Through April and May 2019, the China ASF export expectation partially faded. The forward slaughter book was not loaded to meet the earlier expectations. Cash cutout softened. Front-month futures traded lower in classic cycle-cap fashion.

Lesson: Strong-Profit tail readings catch the regime where producer margins have expanded fast enough to pull expansion decisions forward. The forward curve prices the eventual supply response, which caps the near-term rally. The 2019 case is the cleanest in-sample demonstration of the signal's bearish-tail mechanism.

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What the state-conditional returns have actually done

> **Reference baseline (8,646 Lean Hogs trading days, 1992 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. Baseline source: Z3294 engine parquet joined with Lean Hogs front-month continuous back-adjusted closes.

The Liquidation-Pressure state (composite above plus 0.5), 873 trading days, delivered mean plus 8.43 percent, median plus 4.39 percent. That is plus 8.02 percentage points above the baseline mean and plus 4.42 points above the baseline median. Percent negative was 39.4 percent, 10.4 points better than baseline. This is the strongest conditional edge of the three Lean Hogs margin-channel signals.

The Moderately-liquidation state (composite plus 0.2 to plus 0.5), 380 trading days, delivered mean minus 4.11 percent, median minus 2.45 percent. The band sits below baseline, which is non-monotonic. The signal's power is in the saturated tails.

The Baseline state (composite minus 0.2 to plus 0.2), 6,113 trading days, delivered mean minus 0.35 percent, median minus 0.31 percent. The band dominates the sample at 71 percent of observations and sits modestly below the unconditional baseline.

The Moderate-Profit state (composite minus 0.5 to minus 0.2), 212 trading days, delivered mean plus 2.42 percent, median plus 2.32 percent. The band is weakly constructive, which is also non-monotonic. The pattern across the two MODERATE bands is characteristic of cycle-turning-point readers.

The Strong-Profit state (composite below minus 0.5), 1,068 trading days, delivered mean minus 1.86 percent, median minus 2.55 percent. That is minus 2.27 percentage points below the baseline mean. Percent negative was 58.2 percent.

> **State-conditional returns summary (Lean Hogs forward 60-day)**
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> Liquidation-Pressure, N=873, mean plus 8.43 percent (plus 8.02 pp above baseline). Moderately-liquidation, N=380, mean minus 4.11 percent (minus 4.52 pp below baseline). Baseline, N=6,113, mean plus 2.31 percent, median plus 3.14 percent (minus 0.75 pp below baseline). Moderate-Profit, N=212, mean plus 2.42 percent (plus 2.01 pp above baseline). Strong-Profit, N=1,068, mean minus 1.86 percent (minus 2.27 pp below baseline). Spearman IC rho equals plus 0.0800 at p equals 9.45e-14 across 8,646 trading days.

The 10.30 percentage point tail-to-tail spread on the mean is substantial. The signal's informational edge is concentrated in the two saturated bands; the mid-regions carry noise and should not drive position changes.

How to use the signal today

The current composite reads plus 0.10 (Baseline, slight lean toward margin pressure). Iowa producer margins have run slightly below the trailing-two-year mean through 2026 but not deeply enough to flip into a tail reading.

For a reader asking what the Iowa margin number is saying about the next two months of Lean Hogs: the signal is modestly supportive on the forward supply-tightening side but not at the saturated tail where the sixty-day forward return is predictive. The sustained-margin-pressure accumulation of 2022-2024 has delivered on the futures curve through the 2024 rally; the 2025-2026 margin recovery has stabilized the composite near baseline.

Pair the current reading with the breeding-herd signal and the carcass-weight signal. If feed costs rise meaningfully into Q1 2027 and the margin series moves back into deep deficit, the composite will likely flip toward Liquidation-Pressure within one to two monthly reports. If margins recover, the signal will drift toward Strong-Profit and the forward supply response will cap any near-term rally.

For sizing: the Liquidation-Pressure tail is a cycle-anchor long entry with strong empirical support. The Strong-Profit tail is a cycle-cap short entry with moderate empirical support (the 2021 Q1 counter-case shows the setup can miss during structurally bullish demand regimes). The mid-bands should not drive position changes.

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

Methodology notes

The signal's full-sample Spearman information coefficient against Lean Hogs 60-day forward returns is rho equals plus 0.0800 at p equals 9.45e-14 across 8,646 observable trading days. The in-estate Iowa farrow-finish returns series carries 135 monthly observations from January 2015 to October 2026; pre-2015 history is published by Iowa State University but has not been ingested in the current database.

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. Prior dict ordering would have classified a composite of minus 0.9 as MODERATE_NEG rather than EXTREME_NEG.

The 504-day z-score window captures roughly two years of trailing history. The 63-day minimum population ensures the composite does not fire on insufficient history. The sign flip is applied inside the signal pipeline (`val = tanh(-z)`), not through the engine's `polarity.composite_direction` label. The empirical IC of plus 0.08 confirms this direction is correct for the sixty-day forward horizon.

The engine's practitioner-note documents a documented delay-decay pattern across horizons: 100 percent of maximum IC at horizon 0 trading days, 87 percent at horizon 10, 68 percent at horizon 60, 17 percent at horizon 125, then a sign-inversion to minus 56 percent at horizon 252. This is characteristic

of the hog cycle: margin stress at month 0 drives supply contraction at month 10, drives the price rally; the price rally itself restores margins, which forecasts the next supply expansion phase, which caps the rally after a year. Readers using this signal should treat the sixty-day read as the primary informational horizon and the one-year read as cycle-midpoint-approaching-reversal rather than continuous directional information.

Three complete Liquidation-Pressure episodes anchor the constructive-tail calibration: December 2020 (forward 60-day plus 21.97 percent), December 2021 (plus 19.73 percent), October 2018 (plus 17.92 percent). Three Strong-Profit episodes anchor the opposite tail: April 2019 (minus 19.72 percent), April 2024 (minus 20.53 percent), July 2019 (minus 16.37 percent).

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What this signal does not cover

Five caveats on the signal's reach.

First, the Iowa series captures margin for independent producers who negotiate in the daily spot market. The top-four vertically integrated systems (Smithfield, Tyson, JBS, Seaboard) run on contract placements against barn space, not price. The signal is a slice of the industry (roughly 30 to 40 percent of weekly kill), not the whole industry. The empirical Spearman IC of plus 0.08 reflects this; the catalog's cited plus 0.321 was likely computed on a shorter or older sample window. Readers should size position recommendations against the measured IC, not the catalog claim.

Second, the monthly cadence lag is four to six weeks. If a margin inflection happens in late September, the signal does not see it until early November. The forward lead is partially consumed by the reporting lag.

Third, feed cost volatility can distort the margin read. When corn or soybean meal prices move sharply within the quarter, Iowa returns swing on input-cost noise rather than hog-market signal. Readers should pair the signal with the hog-to-corn ratio for feed-adjusted margin reading.

Fourth, the signal correlates moderately with other Lean Hogs specialists. The engine notes document correlations of plus 0.31 versus a hog-basis signal and plus 0.37 versus the hog-corn ratio. Effective degrees of freedom across the three-signal Lean Hogs margin complex is approximately 2.0. In composite construction, this signal should carry weight approximately 0.5 of its stand-alone IC claim to avoid double-counting.

Fifth, the delay-decay pattern means readers should not extend the forward horizon beyond approximately 125 trading days without expecting sign inversion. The signal is a sixty-to-ninety-day forward reader, not a continuous twelve-month directional trade.

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Iowa producer margins are the industry's clearest economic-pressure signal. The Liquidation-Pressure tail has delivered plus 8.02 percentage points above baseline forward-60-day across 873 state-days. The Strong-Profit tail has delivered minus 2.27 percentage points below baseline across 1,068 state-days. The mechanism is the economic precursor to breeding-herd contraction (or expansion), which drives the biological supply response nine to twelve months forward.

The current reading sits near baseline, with a modest lean toward margin pressure. Watch the November 2026 monthly report for the next cadence.

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