The Dollar × 5Y Note Macro-Stress Signal, Reading Thirty-Six Years of Cross-Asset Regime as a Soybean Commodity-Beta Overlay, And Why the Current Divergence Against Fundamentals Is Where the Book Earns Its Carry

Why the Dollar Index × 5-Year Treasury Note cross-asset macro-stress composite delivers a clean monotonic three-regime edge for soybeans at minus 2.28 percentage points on the risk-off tail versus plus 1.00 percentage points on the risk-on tail, but why the signal matters most when it DIVERGES from the fundamentals read, how the current extreme-risk-off composite of minus 0.961 against a bullish US stocks-contraction reading creates the single most valuable PM configuration in the two-signal stack, and the operational rule for sizing the fundamentals-versus-macro fight when both signals are at their extremes.

David Stendahl · Market Lab Analytics · November 4, 2026

What this signal is

Soybeans trade on fundamentals until they trade on macro. When the dollar surges and US Treasury yields spike, global emerging-market buyers lose purchasing power, Chinese reserve-buying programs lose dollar-financing capacity, and commodity-beta exposure drains from institutional books regardless of what the WASDE balance sheet is saying. When the mix flips, weak dollar, benign yields, risk-on, the mirror plays out and soybeans lift with the global commodity complex. The signal reads the Dollar Index multiplied by the 5-Year Treasury Note as a single cross-asset stress composite, z-scored on a 1260-day (five-year) rolling baseline, tanh-bounded, and sign-flipped so that positive composite reads risk-on and weak-dollar (bullish soy).

The thirty-six-year empirical pattern across 9,046 live-signal days from November 29, 1990 through November 3, 2026 runs clean monotonic three-regime. Risk-on (composite above plus 0.3) covers 63.0 percent of the sample and delivers plus 2.42 percent soy fwd 60-day on average, an edge of plus 1.00 percentage points above the plus 1.42 percent baseline. Normal (composite between minus 0.3 and plus 0.3) covers 9.2 percent and delivers plus 1.45 percent (edge plus 0.03pp). Risk-off (composite below

minus 0.3) covers 27.8 percent and delivers minus 0.86 percent (edge minus 2.28pp). The directional spread is 3.28 percentage points, monotone across the three regimes, with asymmetric strength on the risk-off side, the stress tail carries a larger absolute edge than the tailwind tail.

Current reading as of November 3, 2026: composite minus 0.961, Extreme NEG, phase minus 1, run start November 6, 2024 at 500 trading days in band. The 10th percentile of the full-history distribution. One of the deepest sustained risk-off readings in the modern sample.

Daily Spearman IC against CBOT soybean forward sixty-day return is plus 0.023 at p-value 0.03 across 9,046 live-signal days, significant at the daily resolution, driven by the risk-off tail's strong directional loading. Non-overlapping sixty-three-day independent-sample IC is plus 0.111 at p-value 0.19 across 143 independent blocks, not individually significant on independent samples but directionally consistent with the daily IC. The signal is a macro overlay on fundamentals-based soy positioning, not a standalone edge signal.

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How the DX × FV macro-stress composite composes

The signal reads two direct observations and blends them into a cross-asset stress index.

Leg one: the Dollar Index (DX) daily close, a trade-weighted dollar basket dominated by EUR (approximately 58 percent weight), JPY, GBP, CAD, SEK, and CHF. The Dollar Index is the market-standard dollar-strength proxy, though as discussed in the methodology notes it over-weights European currencies relative to the soy-relevant emerging-market mix.

Leg two: the US 5-Year Treasury Note yield daily close. The 5-year sits in the mid-curve, reading a blend of Fed-funds expectations (the 2-year dominant signal) and term-premium / growth expectations (the 10-year dominant signal). The 5-year is a defensible mid-cycle macro indicator.

Composite construction. The two series are blended into a single cross-asset stress index per the Data Connector specification, z-scored on a 1260-day (five-year) rolling window with a 252-day minimum sample. The z-score is tanh-bounded to the plus-or-minus one range and sign-flipped (inverted) so that positive composite reads risk-on and weak-dollar (bullish soy); negative reads risk-off and strong-dollar (bearish soy). The state machine places plus-or-minus 0.3 as the Risk-off / Normal / Risk-on band boundaries.

The five-year window matters. A macro-regime signal needs a long baseline to span a full dollar cycle, typically seven to ten years from peak to peak. The 1260-day window correctly contextualizes the current reading against the trailing half-cycle; a shorter two-year window (as used in some fundamentals signals) would read every dollar move as "extreme" because dollar trends run long. The design is right for the signal's object.

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What the state-conditional returns have actually done

> **Reference baseline, CBOT soybean fwd 60-day unconditional**

> CBOT soybean ratio-adjusted continuous forward-sixty-day return baseline over the live-signal window of 1990-11-29 through 2026-11-03: mean plus 1.42 percent, median plus 1.08 percent, standard deviation 11.01 percent, percent negative 44.4 percent. Sample 8,983 trading days with observable forward sixty-day. The positive mean and median reflect soybean's structural bull-market history (Chinese import growth from 1996 onward plus biofuel demand expansion); the modest gap between mean and median reflects a modestly right-skewed return distribution.

Per-day sampling, matching the daily Spearman IC construction:

Risk-off (composite below minus 0.3). 2,500 trading days, 27.8 percent of the sample. Per-day mean forward sixty-day minus 0.86 percent, edge minus 2.28 percentage points below baseline. When the two-asset stress composite flips into risk-off, strong dollar and elevated 5-year yields drain commodity beta from institutional books and compress emerging-market purchasing power. The 2014-2015 Fed-taper surge, the 1999-2000 Asian-crisis aftermath, and the 2022-2024 Fed-tightening era are the canonical instances of this tail.

Normal (composite between minus 0.3 and plus 0.3). 826 trading days, 9.2 percent of the sample. Per-day mean forward sixty-day plus 1.45 percent, edge plus 0.03 percentage points above baseline. The middle band is relatively small, the macro-stress composite spends most of its time in one of the extremes, and sits essentially at baseline.

Risk-on (composite above plus 0.3). 5,657 trading days, 63.0 percent of the sample. Per-day mean forward sixty-day plus 2.42 percent, edge plus 1.00 percentage points above baseline. When weak dollar plus benign 5-year yields prevail, commodity beta flows back into institutional books and emerging-market demand firms. The 2007-2013 weak-dollar supercycle, the 2002-2007 pre-GFC commodity rally, and the 2020-2021 pandemic reflation are the canonical instances of this tail.

The directional spread is 3.28 percentage points from the Risk-off tail to the Risk-on tail. The sample is skewed toward the Risk-on state (63 percent versus 28 percent Risk-off), which reflects the fact that the thirty-six-year sample spans two long weak-dollar / commodity-bull eras (1990s secular dollar weakness post Plaza Accord, and 2002-2013 supercycle) against one long strong-dollar era (2022-present Fed-tightening). The asymmetric edge magnitude, minus 2.28pp on Risk-off versus plus 1.00pp on Risk-on, is the signal's defining feature.

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When the dollar matters for soybeans, and when it does not

To size a position against this signal, the first operational question is: when does the dollar actually drive soybeans, and when is it noise? Dana Whitfield, a discretionary-macro portfolio manager running an agricultural book at a commodity-focused fund, the same persona who wrote the companion brief on the US soybean ending-stocks fundamentals signal, frames the answer this way: sixty percent of the time the dollar is noise for a soy book and the macro desk has to shut up and let the ag desk run. The other forty percent it is the dominant driver and you ignore it at your career's expense.

There are three regimes.

Regime A, weak-dollar demand. 2003 through 2008, then 2020 into 2021. DX drifting lower, emerging-market FX strengthening, Chinese purchasing power expanding in CNY terms. US soy priced

in dollars becomes cheaper for the marginal importer. This is when DX matters a lot, the demand function on the export tape is price-elastic for China, and a 10 percent dollar move shows up directly in cash sales and crush margins. In 2020 to 2021 you had the double-whammy: weak dollar plus Chinese herd rebuild driving structural demand. Soy went from eight dollars to seventeen.

Regime B, strong-dollar tightening. 2014 into 2016, then 2022 into 2023. Fed hiking, DX pushing 100 to 105, EM importers struggling with FX pass-through. Brazilian real and Argentine peso depreciating against USD means local-currency soybean revenue for South American producers rises even if CBOT prices fall, so they sell more supply while US exports lose share. This is when strong-dollar bear-flattens the soy complex via both the demand channel (importers cut) and the supply channel (SA producers dump).

Regime C, normal mid-cycle. DX between roughly 90 and 100, 5-year note yields inside a 1.5-to-4-percent band. The dollar is a 5-to-10-percent contributor to soy return variance and not a regime driver. Soy trades on crop, crush, China booking cadence, and weather. The macro-stress composite oscillates around zero and tells you nothing you would put size behind.

The current reading of minus 0.961, raw z minus 2.02, state minus 1 puts us firmly in regime B. Strong dollar, elevated 5-year rates. This is one of the most extreme risk-off readings in the thirty-six-year sample.

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The divergence problem, when fundamentals and macro disagree

The companion signal in the soybean specialist family is Z4400, the US soybean ending-stocks year-over-year z-score. That signal currently reads Moderate POS, composite plus 0.325, state plus 1, US fundamentals are bullish via stocks contraction. The macro-stress signal reads Extreme NEG, composite minus 0.961, state minus 1, macro is bearish via risk-off. The two signals are pointing in opposite directions, and in Whitfield's framing this is the single most valuable moment a PM gets.

The historical precedent book is thin but clear. In 2015 and 2016 the dollar surged from 80 to 100 over the Fed-taper and ECB-QE window. US soy stocks were modestly tight into early 2015 (carryout inside ten-year lows). A Z4400-style fundamentals read was bullish; a Z1246-style macro read was deep risk-off. Soybeans fell from twelve dollars to eight dollars fifty across that window. Macro won by a factor of three. The fundamentals were real but the dollar move overwhelmed them because EM import demand simply did not show up at those FX levels.

In 2020 and 2021, weak dollar, China rebuild, and drought in South America all pulled the same direction. All three legs bullish. No real divergence to adjudicate. In 2018, the trade war move was 100 percent fundamentals (tariff-driven demand destruction). Macro was mid-cycle regime C, silent. Did not confirm or contradict.

The operational rule, from the historical tape, is this. When macro is in the extremes, regime A or regime B, macro wins the fight with fundamentals. When macro is in the middle, regime C, fundamentals win and macro is wallpaper. The current composite of minus 0.961 is firmly regime B. Macro wins.

What that means operationally for the current book. A PM does not run a 15 percent long on the US stocks tightness alone. A PM runs a 5 percent long on the stocks tightness, hedged with long-dated

DX calls or short EM FX, because the base case from the macro overlay is that soy drifts lower even as the US balance sheet gets tighter. The specific trade expression: core long CBOT soybeans via January calls sized five percent (the Z4400 fundamentals tilt); overlay long USD against BRL or MXN, or long DX futures outright, sized to neutralize the macro exposure at the book level; convexity through long soybean straddles around the January WASDE. The point of the divergence setup is that a PM is not picking a side. A PM is selling optionality to a market that thinks one of the two signals is wrong.

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A note on inverted-signal documentation

The engine labels the composite as "DX-FV stress composite (inverted)" in its feature-map metadata. The state-interpretations dictionary in the same engine file, however, carries pre-inversion text: EXTREME_POS is labeled as "Risk-off + strong dollar = commodity headwind" (bearish), while EXTREME_NEG is labeled as "Risk-on + weak dollar = commodity tailwind" (bullish). The empirical state-conditional edges, state plus 1 equals plus 1.00pp bullish, state minus 1 equals minus 2.28pp bearish, confirm the post-inversion direction is positive-equals-bullish. A reader or downstream analyst who consults the state-interpretations dictionary without checking the parquet will mis-side the trade, interpreting a composite of minus 0.961 as "risk-on, bullish" (wrong) rather than "risk-off, bearish" (correct per empirical edges).

This is the kind of documentation defect a PM catches that a quant misses. The engine's behavior is correct; its docstring is stale. In a signal that generates three percentage points of directional spread between tails, siding the composite wrong is a career-ending error. The brief and the yaml both carry the corrected polarity vocabulary throughout; this methodology note surfaces the inconsistency so downstream consumers know to prefer the parquet over the engine's pre-inversion comment block.

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Three cases that frame how to read this signal

Case 1: Jul 2007 – Jul 2013. The weak-dollar commodity supercycle.

The composite moved into the Risk-on band in mid-July 2007 and stayed there for an unprecedented six years through July 2013, the longest sustained Risk-on regime in the modern sample. The 2008 Financial Crisis triggered Federal Reserve rate cuts to zero and a secular weak-dollar policy response that ran through QE1, QE2, and Operation Twist. The Dollar Index dropped from 85 to 72 at peak; 5-year yields fell from 5 percent to below 1 percent. Simultaneously, Chinese commodity demand accelerated and emerging-market buying power surged. CBOT soybean ran from 530 cents per bushel to 1083, a plus 104 percent move over the six-year window.

The 2007-2013 case is the canonical weak-dollar commodity-supercycle signature and the empirical anchor for the signal's Risk-on edge. Importantly for the fundamentals-versus-macro framework, the US fundamentals signal (Z4400 ending-stocks YoY) was also in Extreme POS through most of this window. Both legs of the two-signal stack pulled the same direction. No divergence to adjudicate, and the soy rally extended well past what a fundamentals-only PM would have sized for.

Case 2: Nov 2014 – Aug 2015. The Fed-taper dollar surge, the empirical anchor for "macro wins."

The composite flipped into the Risk-off band in early November 2014 as the Federal Reserve wound down QE3 and began signaling eventual policy normalization. The Dollar Index surged from 85 to 100 over the following nine months in one of the sharpest dollar-strengthening episodes of the modern era. The 5-year note yield simultaneously rose from 1.5 percent to above 2 percent as the market priced in eventual Fed hikes.

Commodity beta drained from institutional books. CBOT soybean dropped from 1030 cents per bushel to 908, a minus 11.9 percent move over the window. The 2014-2015 case is operationally important because US ending stocks were modestly tight at the time, a Z4400-style fundamentals-only read was bullish. The macro stress signal correctly flagged the regime inflection and the macro channel won the fight. A PM who sized fundamentals-only long into the Fed-taper window took a 12 percent drawdown against soy that would not have happened with the macro overlay in place.

Case 3: Feb 2022 – present. The Fed-tightening era and the longest sustained Risk-off run.

The composite moved into the Risk-off band in early February 2022 as the Federal Reserve began its aggressive hiking cycle in response to post-pandemic inflation. The Dollar Index surged from 96 to 114 over the subsequent eighteen months, 5-year Treasury yields ran from 1.5 percent to above 4.5 percent, and commodity beta flowed out of institutional books through the 2022-2024 window. CBOT soybean peaked at 1700 cents in mid-2022 then drifted lower in waves, trading near 1214 cents by late 2026.

The composite has stayed in the Risk-off band for approximately 1450 of the last 1750 trading days, the longest sustained Risk-off run in the thirty-six-year sample and the empirical anchor for the current reading. The 2022-present case is the Fed-tightening era lived through the macro-overlay lens. The current fundamentals-versus-macro divergence (Z4400 bullish, Z1246 bearish) is a late-stage iteration of this cycle, US soy stocks are tightening back into the Fed-tightening macro environment, and the historical precedent says the macro overlay will dominate until the composite normalizes above minus 0.3.

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How to use the signal today

As of November 3, 2026, the composite reads minus 0.961 in the Extreme NEG band and the phase has been running 500 trading days since November 6, 2024. The baseline state-conditional expectation is minus 0.86 percent soybean forward sixty-day, a modest bearish tilt that compounds against the structurally-positive soy baseline of plus 1.42 percent fwd 60-day. The signal is deep in the historical risk-off tail, roughly at the 10th percentile of the full-history distribution.

The practical PM move in the current fundamentals-bullish / macro-bearish divergence configuration is to scale fundamentals-based long soy exposure down (not out) and overlay an explicit macro hedge until the stress reading normalizes. A specific expression in Whitfield's framing: five percent long soybeans via January calls (the Z4400 fundamentals tilt, sized small for the WASDE calendar), three percent short EM FX overlay (BRL or MXN against USD) or long DX futures outright, and two percent long soybean January straddles for convexity around the WASDE catalyst. The point is to be

paid for being wrong on either leg, you are selling optionality to a market that thinks one of the two signals is capitulating.

The triggers to re-engage long soy aggressively: composite rising above minus 0.3 (exits Extreme NEG) AND the US ending-stocks fundamentals signal remaining in Moderate POS. If macro normalizes toward zero while fundamentals stay bullish, the divergence has resolved in the direction the fundamentals signal predicted and the convergence trade pays. The reverse trigger: fundamentals signal flips back to Normal while macro remains Extreme NEG. That resolution says macro has won the fight and the long-soy book is simply wrong.

Pair with the US ending-stocks fundamentals sibling (Z4400) as the fundamentals read, the CFTC managed-money positioning sibling (Z2910) for the "already in the price" cross-check, and the soybean term-structure sibling (Z2643) for the curve-side confirmation of the risk-off regime.

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Methodology notes

Data sources. (A) Dollar Index daily close from the symbol_data estate (FRED DX-Y.NYB equivalent). (B) US 5-Year Treasury Note yield daily close from the symbol_data estate. (C) CBOT soybean ratio-adjusted continuous (`S__1170RD` from CSI) as the forward-return benchmark.

Signal construction. Cross-asset DX-times-FV macro-stress composite computed per the Data Connector specification. Z-scored on a 1260-day (five-year) rolling window with 252-day minimum sample. Tanh-bounded to the plus-or-minus one range and sign-flipped (inverted) so that positive composite reads risk-on and weak-dollar (bullish soy). State machine uses plus-or-minus 0.3 as the Risk-off / Normal / Risk-on band boundaries.

Validation statistics. Daily Spearman IC against CBOT soybean forward sixty-day return is plus 0.0227 at p-value 0.031 across 9,046 live-signal days from 1990-11-29 through 2026-11-03, significant at the daily resolution. Non-overlapping sixty-three-day independent-sample IC is plus 0.1113 at p-value 0.186 across 143 independent blocks, not individually significant on independent samples. State-conditional per-day means are clean monotonic: Risk-on plus 2.42 percent (edge plus 1.00 percentage points), Normal plus 1.45 percent (edge plus 0.03 percentage points), Risk-off minus 0.86 percent (edge minus 2.28 percentage points). Baseline median is plus 1.08 percent; standard deviation is 11.01 percent.

Five-year window rationale. A macro-regime signal needs a long baseline to span a full dollar cycle (typically 7-to-10 years from peak to peak). The 1260-day (five-year) window correctly contextualizes the current reading against the trailing half-cycle; a shorter two-year window would read every dollar move as "extreme" because dollar trends run long.

Benchmark construction. CBOT soybean 60-day forward return computed as `close.pct_change()` from the `S__1170RD` ratio-adjusted continuous CSI file, rolled over 63 trading days and shifted forward.

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What this signal does not cover

> **Blind spots a PM cares about before sizing against the macro signal**

First, DX is a six-currency basket dominated by EUR (approximately 58 percent weight), JPY (14 percent), and GBP (12 percent), the mix that defined dollar strength in the 1970s. The soy-relevant trade-weighted dollar basket is very different: Chinese yuan, Brazilian real, Mexican peso, Indonesian rupiah, and European-feed-compounder currencies are the actual pass-through channels for soy demand. A reading that moves on EUR/USD but not on CNY/USD or BRL/USD can flag macro-stress that is not actually transmitted to soy demand. The trade-weighted broad USD index (FRED DTWEXBGS) is a better companion read.

Second, the 5-year Treasury note yield is a specific tenor. 10-year or 2-year tell different stories, the 2-year reads Fed-funds-expectation directly, the 10-year reads growth-and-term-premium, the 5-year sits in the middle. The signal's choice of the 5-year is defensible as a mid-curve read but is a design choice, not a neutral observation.

Third, correlation of DX and FV to soybean returns is time-varying. During risk-correlation-spike episodes (2008 Lehman, 2020 March, selected Fed-pivot days) all assets move together and the macro-stress signal loses its directional edge, everything is risk-off at once and the composite tells you nothing about the within-asset leader-lagger structure.

Fourth, the signal does not distinguish fiscal versus monetary dollar drivers. A strong dollar from Fed hawkishness (demand-destructive, bearish commodities) is different from a strong dollar from US fiscal strength and foreign capital inflow (growth-positive, can co-exist with strong commodities). The 1990s Asian Financial Crisis featured a strong dollar that was benign for US commodity demand; the 2022-2023 Fed hiking featured a strong dollar that was lethal for commodity demand. The composite reads both the same way.

Fifth, the non-overlap IC of plus 0.111 at n=143 is not individually significant at p=0.186. The signal survives as a regime overlay because the state-conditional edges are large and monotonic, but a quant demanding standalone statistical significance at the 95 percent level will reject the signal at the family-wise Bonferroni correction (alpha equal 0.05 divided by the 100-plus soybean specialist signals). Treat the signal as corroborating evidence in the fundamentals-plus-macro two-signal stack rather than as a standalone edge.

Sixth, as noted in the methodology section, the engine's `state_interpretations` dictionary carries pre-inversion polarity text while the composite is post-inversion. Downstream analysts and any auto-consumer that reads the dictionary without parquet verification will mis-side the trade. The engine behavior is correct; the docstring is stale. Prefer the parquet.

This research brief is for informational purposes only and does not constitute investment advice. Past performance is not indicative of future results. State-conditional statistics are computed through 2026-11-03 against CBOT soybean ratio-adjusted continuous. The non-overlapping-period IC and multiple-testing-correction considerations are explicitly disclosed, and the inverted-signal documentation gap is surfaced. Data sources: Dollar Index (DX-Y.NYB) daily close, US 5-Year Treasury Note yield daily close, CSI `S__1170RD` ratio-adjusted continuous target. Internal Phase 0 audit dated 2026-11-04.