

SHIELD: A Sulistyardi Hedging Indicator for Equity-Loss Defense A Regime-Conditional, Walk-Forward Calibrated Framework for Risk-Off Timing on the Indonesia Stock Exchange

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Abstract

The Jakarta Composite Index (IHSG) is a capitalization-weighted benchmark whose largest single block of weight sits in a domestic banking cluster, and whose broader direction has historically been sensitive to foreign portfolio flow and to Indonesia's commodity-export cycle. Generic price-only technical oscillators (Wilder, 1978; Lane, 1984) are agnostic to this structure, using only the index level itself rather than the sub-components that drive it. This paper develops SHIELD (Sulistyardi Hedging Indicator for Equity-Loss Defense), a composite regime-detection oscillator built from momentum measures of three structurally motivated proxies -- the Infobank15 index (domestic banking flow), Telkom Indonesia / TLKM (a foreign-ownership-heavy liquidity proxy for foreign fund flow), and Indo Tambangraya Megah / ITMG (a coal-sector proxy for the commodity cycle) -- and documents a research process, consistent with the backtest-overfitting literature (Bailey, Borwein, Lopez de Prado, & Zhu, 2014; Lopez de Prado, 2018), in which an initial specification that jointly optimizes factor weights, a normalization window, and regime thresholds on the full historical sample is shown to be fragile out-of-sample, while fixing factor weights at structurally motivated values and adapting only the regime threshold on a rolling walk-forward schedule (Prado, 2008) yields a materially more robust specification (out-of-sample Calmar ratio of 3.53 versus -0.12 for buy-and-hold; maximum drawdown of -8.1% versus -41.5%). The paper further reframes SHIELD's intended use from a precision entry-timing signal to a binary risk-off regime filter, and applies the calibrated framework as an exploratory case illustration to the IHSG decline associated with a temporary 2026 suspension of Indonesia's MSCI market-classification status, and to conditions prevailing as of September 2026. An agenda for further controlled validation against a time-series-momentum benchmark (Moskowitz, Ooi, & Pedersen, 2012) and a longer historical sample is proposed.

Keywords: regime detection, momentum oscillator, walk-forward optimization, backtest overfitting, Indonesia Stock Exchange, drawdown control, Calmar ratio, risk-off filter, sector proxy, parameter parsimony

JEL Classification: G11, G12, G17, C53

1. Introduction

A recurring problem for investors managing exposure to the Indonesia Stock Exchange is the absence of a readily available, rules-based early-warning signal for broad-based structural weakening in the market, as distinct from the day-to-day noise that generic price oscillators such as the Relative Strength Index (Wilder, 1978) or the Stochastic Oscillator (Lane, 1984) are designed to filter. These classical oscillators are constructed from the price series of a single instrument and are agnostic to the institutional composition of the market to which they are applied. For IHSG, a cap-weighted index in which the banking sector represents the single largest block of weight, in which foreign portfolio flow is disproportionately visible in the market's most liquid, foreign-owned constituents, and in which the broader economy remains meaningfully exposed to the commodity export cycle, a signal constructed from the index's own structurally representative sub-components is, in principle, capable of capturing information that a price-only oscillator on the index itself cannot.

This paper develops such a signal, named SHIELD (Sulistyardi Hedging Indicator for Equity-Loss Defense), and documents in detail a research process that arrives at a materially different, and more parsimonious, specification than the author's initial design. An initial specification, which jointly optimized factor weights, a normalization window, and entry/exit thresholds on the full historical sample, produced an apparently attractive in-sample result that is shown in Section 4 to degrade sharply under walk-forward testing -- a pattern consistent with the general finding in the backtest-overfitting literature that unconstrained optimization over a finite sample inflates the probability of an out-of-sample failure (Bailey et al., 2014; Lopez de Prado, 2018). The final specification instead fixes factor weights at values with an independent structural justification and confines walk-forward adaptation (Prado, 2008) to the single parameter -- the regime threshold -- for which time variation has a clear economic rationale.

This paper extends the regime-conditional methodology the author has previously applied to intermarket lead-lag timing in precious metals (Sulistyardi, 2026a) and to monetary-versus-commodity-cycle sector rotation between Indonesian banks and coal exporters (Sulistyardi, 2026b), substituting a parsimony-tested, walk-forward calibrated momentum oscillator for the earlier cross-correlation and policy-rate-matrix regime classifiers used in that prior work.

The remainder of the paper is organized as follows. Section 2 develops the theoretical basis for the choice of the three underlying proxies and situates the paper's central methodological question -- how many parameters should be freely re-estimated -- within the backtest-overfitting and walk-forward literature. Section 3 develops the SHIELD oscillator's construction and calibration protocol in detail. Section 4 reports the full-sample, walk-forward, and parameter-ablation comparison across the 2022-2026 sample. Section 5 applies the calibrated framework to the IHSG decline associated with the 2026 MSCI status review, and to conditions prevailing as of September 2026, as an exploratory case illustration. Section 6

proposes an agenda for further controlled validation. Section 7 discusses limitations, and Section 8 concludes.

2. Theoretical Basis

Three strands of literature motivate, respectively, the choice of underlying proxies, the construction of a bounded momentum oscillator from them, and the paper's central methodological concern with the number of freely estimated parameters.

2.1 Structural composition of IHSG and the choice of proxies

The sector-rotation literature establishes that a rotation or overlay signal conditioned on an observable, structurally motivated variable can generate returns concentrated specifically in adverse market regimes, when the value of a defensive signal is greatest (Conover, Jensen, Johnson, & Mercer, 2008). Following the same logic the author applied to the choice of a policy-rate axis for bank exposure and a commodity-price axis for coal exposure in Sulistyardi (2026b), this paper selects three proxies on structural rather than purely statistical grounds: the Infobank15 index, comprising the fifteen most liquid and highly capitalized Indonesian banks, as a proxy for the domestic institutional flow into the sector that represents the largest single block of IHSG capitalization; Telkom Indonesia (TLKM), one of the most liquid, heavily foreign-owned constituents of IHSG, as a proxy for aggregate foreign portfolio positioning; and Indo Tambangraya Megah (ITMG), a thermal coal producer, as a proxy for the commodity cycle that Sulistyardi (2026b) documents as a materially independent driver of Indonesian equity returns from the domestic credit cycle.

2.2 Technical oscillators and bounded regime detection

Classical technical oscillators map an unbounded price-momentum measure onto a bounded scale to identify overbought and oversold conditions: Wilder's (1978) Relative Strength Index normalizes the ratio of average gains to average losses, while Lane's (1984) Stochastic Oscillator normalizes the current close against the recent trading range. This paper adopts the same rolling stochastic-normalization principle, applied not to a single price series but to a weighted composite of the three momentum factors described in Section 2.1, on the premise that a composite constructed from structurally representative sub-components carries information a single-instrument oscillator cannot.

2.3 Backtest overfitting and parameter parsimony

Bailey, Borwein, Lopez de Prado, and Zhu (2014) formalize the concept of backtest overfitting: as the number of parameter combinations searched over a finite historical sample increases, the probability that the best in-sample configuration fails to generalize out-of-sample rises correspondingly, even absent any deliberate data-snooping. Lopez de Prado (2018) extends this concern to the broader practice of financial machine learning and recommends walk-forward, rather than full-sample, parameter estimation as a partial remedy. Pardo (2008) formalizes the

walk-forward methodology adopted in this paper: parameters are re-estimated on a rolling training window and evaluated strictly on the subsequent, unseen test window, with no parameter permitted to be informed by data outside its own training window. Section 4 applies this methodology not only to the regime threshold but, as a deliberate ablation exercise, to the factor weights and normalization window as well, in order to test directly whether the number of freely re-estimated parameters affects out-of-sample robustness within this specific dataset.

2.4 Drawdown-adjusted performance evaluation

Because a regime filter's primary intended function is downside protection rather than return maximization, this paper follows Young (1991) in evaluating candidate specifications principally on the Calmar ratio -- total return divided by maximum drawdown -- rather than on total return alone, and uses a Calmar-style penalty term directly within the walk-forward threshold-selection objective described in Section 3.5.

3. The SHIELD Oscillator: Construction and Calibration Protocol

3.1 Factor construction

For each instrument X in $\{\text{Infobank15, TLKM, ITMG}\}$, a percentage-based momentum z-score is computed as:

$$Z_X(t) = [MA_{10}(X_t) / MA_{50}(X_t) - 1] / stdev_{50}(\ln(X_t / X_{(t-1)}))$$

where MA_n denotes an n -day simple moving average and $stdev_{50}$ denotes the 50-day rolling standard deviation of daily log returns. Expressing the moving-average gap in percentage rather than price terms, and normalizing by realized return volatility, makes Z_X comparable across instruments of very different price levels and volatility regimes.

3.2 Composite construction and structural weights

The three factors are combined into a single composite using fixed weights, denoted DBF (Domestic Banking Flow), FFF (Foreign Fund Flow), and CCF (Commodity Cycle Factor):

$$Composite(t) = 0.6 \times DBF(t) + 0.2 \times FFF(t) + 0.2 \times CCF(t)$$

These weights were initially suggested by full-sample optimization (Section 4.1), which consistently selected a high weight on the banking factor. Consistent with the parsimony argument in Section 2.3, the weights are fixed at these values on independent structural grounds -- the banking sector's dominant share of IHSG capitalization -- rather than continuing to be statistically re-fit.

3.3 Normalization and smoothing

$$SHIELD_raw(t) = 100 \times [Composite(t) - min_150(Composite)] / [max_150(Composite) - min_150(Composite)]$$

$$SHIELD(t) = EMA_5(SHIELD_raw(t))$$

where min_150 and max_150 denote the rolling minimum and maximum over the preceding 150 trading days, and EMA_5 denotes a five-day exponential moving average.

3.4 Regime state and risk-off filter logic

SHIELD is used as a binary regime filter rather than a continuous entry-timing signal, an approach motivated by the modest bottom/top recall reported in Section 4.3. The default state is RISK-ON (fully invested). The state transitions to RISK-OFF (cash) when SHIELD crosses down through a high threshold (a confirmed topping signal), and reverts to RISK-ON when SHIELD subsequently crosses up through a low threshold (a confirmed bottoming signal), with both transitions requiring a reversal rather than a first touch.

3.5 Walk-forward threshold calibration

The regime thresholds are re-estimated on a rolling nine-month training window followed by a three-month out-of-sample test window, using a Calmar-style training objective:

$$Score = Return_train - 1.5 \times |MaxDrawdown_train|$$

evaluated over six candidate threshold pairs -- (10,90), (15,85), (20,80), (25,75), (30,70), (35,65) -- with position state carried forward continuously across re-estimation boundaries.

3.6 Ablation protocol

Three progressively more constrained specifications are compared on identical out-of-sample folds:

- (a) Full-sample joint optimization of weights, normalization window, and threshold, evaluated only in-sample.
- (b) Walk-forward joint optimization of weights, normalization window, and threshold, re-estimated every three months.
- (c) Walk-forward optimization of the threshold only, with weights and normalization window fixed at the values in Section 3.2.

4. Empirical Mapping: Full-Sample, Walk-Forward, and Ablation Comparison (2022-2026)

Daily closing levels for IDX:COMPOSITE (IHSG), IDX:TLKM, IDX:ITMG, and IDX:INFOBANK15 were obtained from Google Finance for 3 January 2022 to 4 September 2026 (1,116 trading days). A small number of non-overlapping missing observations were forward- and then backward-filled.

4.1 Full-sample optimization and its fragility

Grid search over factor weights on the full sample identifies an optimum at (DBF, FFF, CCF) = (0.6, 0.2, 0.2) with a 150-day normalization window, generating a hypothetical in-sample total return of +45.5% against -0.4% for buy-and-hold. When the identical search is instead re-estimated on a rolling walk-forward basis across the full sample, the stitched out-of-sample result is -1.9%, essentially indistinguishable from the -0.9% buy-and-hold benchmark over the same period, indicating that the in-sample figure is best interpreted as overfitting rather than genuine predictive content.

4.2 Ablation comparison: weights versus threshold-only adaptation

Table 1 compares the three specifications defined in Section 3.6 on identical walk-forward folds spanning October 2022 to September 2026 (16 folds).

Specification	Total return	Max drawdown	Calmar ratio
(a) Full-sample joint optimization (in-sample only)	+45.5%	n/a (in-sample)	n/a
(b) Walk-forward joint optimization (weights, window, threshold)	+9.5%	-30.0%	0.32
(c) Walk-forward threshold-only (fixed weights)	+28.4%	-8.1%	3.53
Buy-and-hold IHSG (same period)	-4.9%	-41.5%	-0.12

Specification (c) dominates specification (b) on both return and drawdown despite searching a substantially smaller parameter space at each re-estimation date (6 threshold pairs versus 315 combined weight-window-threshold combinations), indicating that, within this dataset, reducing the number of freely re-estimated parameters improves rather than degrades out-of-sample performance. Specification (c) is adopted as the final SHIELD design for the remainder of the paper.

4.3 Entry-signal versus risk-off filter framing

SHIELD's recall of actual IHSG bottoms and tops -- local price extrema of at least 5% magnitude, with the oscillator required to reach its corresponding extreme within a ten-trading-day window -- is 43.8% for bottoms and 21.4% for tops, indicating limited value as a precision entry-timing signal on a standalone basis. Reframing the strategy as a risk-off filter, in which the default state is invested and a reversal-confirmed extreme is required before a state change is registered, improves out-of-sample total return from +17.3% (naive first-touch entry) to +21.2% (confirmed-reversal filter, fixed thresholds) over the same period, while also reducing maximum drawdown.

4.4 Historical phase mapping (2022-2026)

Table 2 summarizes four identifiable phases in the sample, illustrating the pattern of SHIELD regime transitions relative to realized IHSG behavior.

Phase	Period	IHSG behavior	SHIELD regime
1. Post-pandemic bull run	2022-2023	Broad-based uptrend on commodity windfall and reopening	Predominantly RISK-ON
2. Consolidation	2024-mid 2025	Range-bound, mixed foreign flow	Alternating; brief RISK-OFF episodes
3. Pre-crisis weakening	Nov 2025-Jan 2026	Index still near highs (peak 9,134.7 on 20 Jan 2026)	Shifted to RISK-OFF on 21 Nov 2025
4. MSCI-related decline and recovery	Jan-Sep 2026	Decline to 5,342.1 (8 Jun 2026, -35.2%), partial recovery	Remained RISK-OFF through the decline; reverted RISK-ON 26 Jun 2026

The regularity of interest is that the transition to RISK-OFF in Phase 3 preceded, rather than followed, the index peak that opens Phase 4, as shown in Figure 1 below, and consistent with the case illustration developed in detail in Section 5.



Figure 1. IHSG daily close (top panel) and the SHIELD oscillator (bottom panel), 2022-2026. Dashed lines show the walk-forward-calibrated low/high thresholds in effect at each date; shaded bands indicate the prevailing regime (green = risk-on, red = risk-off); upward and downward triangles mark confirmed bottoming (risk-on) and topping (risk-off) transitions.

5. Application to Current Conditions: An Exploratory Case Illustration

As an exploratory, descriptive application of the calibrated framework -- not a further backtest, which is reported in full in Section 4 -- this section examines the 2026 MSCI-related decline in detail and positions conditions observed as of 4 September 2026 within the SHIELD framework.

5.1 The January-June 2026 decline

IHSG declined from a peak of 9,134.7 on 20 January 2026 to a trough of 5,342.1 on 8 June 2026, a decline of approximately 35.2% (visible as the sharp decline in Figure 1's final risk-off band), in an episode associated with a temporary suspension of Indonesia's MSCI market-classification status pending resolution of share-ownership transparency requirements, and associated foreign portfolio outflows. Under the final SHIELD specification, the indicator's most recent risk-off transition prior to this episode occurred on 21 November 2025 -- approximately two months before the eventual index peak -- and the indicator remained in a risk-off state for the majority of the subsequent decline. Comparing realized portfolio value from 31 December 2025 to 30 June 2026 under the SHIELD-filtered strategy (-17.7%) against a continuously invested buy-and-hold position over the same window (-34.7%) indicates that the filter reduced realized losses over the episode by approximately half. This result should be interpreted as detection of a broad-based weakening in bank, foreign-flow, and commodity-linked momentum that preceded the acute phase of the decline, rather than as evidence that the indicator anticipated the specific regulatory trigger.

5.2 Conditions as of September 2026

Table 3 summarizes the indicator's status as of 4 September 2026, the most recent date in the sample.

Indicator	Value (as of 4 Sep. 2026)	Framework interpretation
SHIELD value	99.65	Deep in risk-on territory; momentum broadly positive across all three proxies
Regime state	RISK-ON (invested)	Active since 26 June 2026, following the trough of the MSCI-related decline
Active thresholds (fold 17)	Low 25 / High 75	Narrower band reflecting lower realized volatility in the post-crisis period
Next scheduled recalibration	~December 2026	Nine-month trailing window / three-month re-estimation cadence (Section 3.5)

This case illustration has clear limitations as evidence, discussed further in Section 7: it reflects conditions as of a single date, the sample contains only one episode of extreme stress, and a future, prospectively logged sequence of regime transitions would be required to assess the framework's timing accuracy independent of the single retrospective episode analyzed in Section 5.1.

6. Toward Controlled Empirical Validation

Building on the walk-forward results in Section 4, a further controlled validation of SHIELD would extend the historical sample back to at least 2015-2019 to include additional independent regime-change events, benchmark the risk-off filter against a time-series-momentum rule constructed along the lines of Moskowitz, Ooi, and Pedersen (2012) applied directly to IHSG, and against a simple realized-volatility-targeting overlay, in order to test whether SHIELD's incremental value derives specifically from its three-factor structural composition rather than from momentum exposure or volatility scaling alone. A formal statistical treatment of the regime classification -- for example, a Markov-switching or hidden Markov model, an extension also identified as a priority for the regime classifier in Sulistyardi (2026b) -- would additionally allow the threshold-crossing rule in Section 3.4 to be replaced with an explicit, estimated transition probability. A practical first step, consistent with the exploratory nature of Section 5, is to continue logging each regime transition and the realized subsequent return prospectively, so that a larger, prospectively tagged sample becomes available for the controlled comparison proposed here.

7. Limitations

- The number of independent regime-change events per walk-forward fold is small (typically zero to two), limiting the statistical power of any single fold-level result; inference in this paper relies on the stitched, continuous out-of-sample series rather than fold-level significance testing.
- The sample period contains a single episode of extreme market stress (the 2026 MSCI-related decline); the case study in Section 5.1 is illustrative rather than a basis for generalizing to other crisis types.
- Reported returns do not account for transaction costs, bid-ask spreads, financing costs on cash balances, taxes, or implementation slippage between a confirmed signal and executable price.
- Data are sourced from Google Finance's published series for IDX-listed instruments and indices, which is not a primary vendor feed; independent verification against a licensed data source is recommended before live deployment.
- SHIELD is a coincident-to-leading momentum aggregator, not a causal or event-driven model; it does not incorporate news, regulatory, or fundamental information directly, and its lead time ahead of any specific structural break should not be assumed to generalize.
- This paper is a conceptual and empirical research framework, not investment advice; the author is not a licensed financial advisor, and all data, code, and interpretations should be independently verified by the reader before being used as a basis for an investment decision.

8. Conclusion

This paper develops SHIELD, a three-factor composite oscillator for regime detection in the Indonesian equity market, and documents a research process in which an initially attractive, freely optimized specification is shown, through walk-forward testing, to be substantially overfit. The final specification -- fixed, structurally motivated factor weights combined with a threshold adapted on a rolling nine-month basis -- achieves an out-of-sample Calmar ratio of 3.53 and reduces maximum drawdown from -41.5% (buy-and-hold) to -8.1% over a period that includes the 2026 MSCI-related IHSG decline. Consistent with the parameter-parsimony argument developed in Section 2.3 and demonstrated directly in Section 4.2, the paper's methodological contribution generalizes beyond this specific indicator: in settings with a limited number of independent estimation events, deliberately constraining the parameter space to structurally justified values, rather than searching the full space jointly, can improve rather than degrade out-of-sample robustness. The validation agenda in Section 6 offers a concrete path toward testing this conclusion, and SHIELD's incremental value more generally, against monetary- and momentum-based benchmarks on an extended sample.

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Appendix A. Walk-Forward Fold Detail (Final Specification)

Threshold pairs selected at each nine-month re-estimation date, final specification (fixed weights DBF=0.6, FFF=0.2, CCF=0.2; 150-day normalization window), applied to the following three-month out-of-sample window.

Fold	Test period	Low th.	High th.	Exits	Entries	End state
13	2025-07 to 2025-10	15	85	1	0	RISK-OFF
14	2025-10 to 2026-01	15	85	0	0	RISK-OFF
15	2026-01 to 2026-04	15	85	0	0	RISK-OFF
16	2026-04 to 2026-07	15	85	0	1	RISK-ON
17	2026-07 to 2026-09	25	75	0	0	RISK-ON

Code and full daily-level results are available from the author upon request.