Regime-adaptive XGBoost · NVDA · descriptive replay

Strategy evaluated · Development · Sample 2018-12-31 21:00:00+00:00 to 2023-12-29 21:00:00+00:00

N/A marks an undefined or missing value. Return and risk fractions are shown as percentages. The JSON evidence preserves the original precision of the results.

Assessment limits

Survivorship bias. Not assessed. Evidence on historical universe membership is missing.

Look-ahead bias. Not assessed. The report does not verify when signals became available.

Multiple testing. DSR and PBO cannot be assessed from the evidence supplied.

Costs and execution. Gross and net returns were reconciled with recorded costs. Cost sensitivity and actual execution were not assessed.

Use of AI. The engine computes the metrics. Use of AI in strategy development was not assessed.

Advice. This report does not constitute investment advice.

Performance and risk

Absolute performance · Strategy and benchmark

Metric	Strategy	Benchmark
Annualized arithmetic return `annual_return_arithmetic`	-7.34397%	14.3405%
Annualized volatility `annual_volatility`	10.2371%	20.3371%
Periods per year `annualization`	252	252
Annualized compound return (CAGR) `cagr`	-7.56853%	13.0378%
Calmar `calmar`	-0.189788	0.3833626
Excess kurtosis `excess_kurtosis`	7.235445	14.55681
Alias for the share of positive periods `hit_rate`	43.1295%	55.282%
Maximum drawdown `max_drawdown`	-39.8789%	-34.009%
Periods from the previous peak to recovery `max_drawdown_recovery_periods`	N/A	134
Periods to the maximum drawdown trough `max_drawdown_underwater_periods`	1156	27
Observations `n_obs`	1259	1259
Share of positive periods `positive_period_rate`	43.1295%	55.282%
Annual risk-free rate `risk_free_annual`	0%	0%
Sharpe `sharpe`	-0.7173866	0.705138
Skewness `skewness`	-0.5502983	-0.8030004

Absolute performance · Strategy and benchmark

Metric	Strategy	Benchmark
Sortino `sortino`	-0.9515394	0.9751576
Cumulative return `total_return`	-32.5107%	84.462%

Active performance · Strategy versus benchmark

Field	Value
Annualized active return `active_return_annual`	-21.6844%
Periods per year `annualization`	252
Benchmark Sharpe ratio `benchmark_sharpe`	0.705138
Beta `beta`	-0.01002251
Correlation with the benchmark `correlation`	-0.01991078
Information ratio `information_ratio`	-0.9448694
Annualized Jensen alpha `jensen_alpha_annual`	-7.20024%
Observations `n_obs`	1259
Annualized regression alpha `regression_alpha_annual`	-7.20024%
Annual risk-free rate `risk_free_annual`	0%
Strategy Sharpe ratio `strategy_sharpe`	-0.7173866
Annualized tracking error `tracking_error_annual`	22.9497%

Statistical uncertainty

Strategy · Sharpe ratio interval · block bootstrap

Field	Value
Replications attempted `attempted_repetitions`	1000
Block length `block_length`	5
Lower interval bound `ci_lower`	-1.539429
Upper interval bound `ci_upper`	0.03790436
Confidence level `confidence`	95%
Lower-tail probability `lower_probability`	2.5%
Observations `n_obs`	1259
Point estimate `point_estimate`	-0.7173866

Strategy · Sharpe ratio interval · block bootstrap	
Field	**Value**
Replications `repetitions`	1000
Seed `seed`	42
Standard error `standard_error`	0.3955531
Status `status`	evaluated
Replications with no defined estimate `undefined_repetitions`	0
Upper-tail probability `upper_probability`	97.5%
Valid replications `valid_repetitions`	1000

Strategy · Mean excess return · HAC	
Field	**Value**
Annualized estimate `annualized_estimate`	-7.34397%
Annualized standard error `annualized_standard_error`	4.07348%
Estimate per period `estimate`	-0.0291427%
Weighting kernel `kernel`	bartlett
Lags `lags`	7
Observations `n_obs`	1259
Two-sided p-value (normal) `p_value_two_sided_normal`	0.07140841
Standard error `standard_error`	0.0161646%
Status `status`	evaluated
t-statistic `t_stat`	-1.802871

Benchmark · No uncertainty estimate supplied.

Active performance · Information ratio interval · block bootstrap	
Field	**Value**
Replications attempted `attempted_repetitions`	1000
Block length `block_length`	5
Lower interval bound `ci_lower`	-1.917261
Upper interval bound `ci_upper`	-0.1883429
Confidence level `confidence`	95%

Active performance · Information ratio interval · block bootstrap	
Field	**Value**
Lower-tail probability `lower_probability`	2.5%
Observations `n_obs`	1259
Point estimate `point_estimate`	-0.9448694
Replications `repetitions`	1000
Seed `seed`	42
Standard error `standard_error`	0.4391226
Status `status`	evaluated
Replications with no defined estimate `undefined_repetitions`	0
Upper-tail probability `upper_probability`	97.5%
Valid replications `valid_repetitions`	1000

Active performance · Mean active return · HAC	
Field	**Value**
Annualized estimate `annualized_estimate`	-21.6844%
Annualized standard error `annualized_standard_error`	9.56069%
Estimate per period `estimate`	-0.0860494%
Weighting kernel `kernel`	bartlett
Lags `lags`	7
Observations `n_obs`	1259
Two-sided p-value (normal) `p_value_two_sided_normal`	0.02332415
Standard error `standard_error`	0.0379393%
Status `status`	evaluated
t-statistic `t_stat`	-2.268083

Subperiods and robustness

Additional metrics · No evidence supplied.

Verification and configuration

Engine checks	
Field	**Value**
Schemas valid `schema_valid`	Yes
Evidence hash valid `hash_valid`	Yes
Signature verified `signature_verified`	No
Confirmatory provenance verified `confirmatory_provenance_verified`	No
`reconciliation.tolerance`	1e-09
Status `reconciliation.status`	reconciled
Metric paths checked `reconciliation.checkedPathCount`	96
Hash bindings valid `hash_bindings_valid`	Yes
Metrics reconciled `metrics_reconciled`	Yes
Simulations reproduced `simulations_reproduced`	Yes
`kernelVersion`	1.1.0

Decision thresholds · No evidence supplied.

Engine configuration	
Field	**Value**
`allowPositional`	No
Periods per year `annualization`	252
Annualization method `annualizationMethod`	declared by StrategyTrace.frequency.periodsPerYear
`calendar`	XNYS
Annual risk-free rate `riskFreeAnnual`	0%
`timezone`	UTC
Block length `uncertainty.blockLength`	5
Confidence level `uncertainty.confidence`	95%
`uncertainty.hacLagPolicy.kind`	sample-size-bartlett-v1
Replications `uncertainty.repetitions`	1000
Seed `uncertainty.seed`	42
Expected calendar hash `uncertainty.timeBasis.expectedEndsHash`	`5ef022b91801c925f8a4c04f8923abc37636dede6f539569a88ddddea5717956`
`uncertainty.timeBasis.kind`	session-grid

Monte Carlo

Observed path

Field	Value
Longest losing streak (periods) `longestLosingStreak`	9
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	1208
Maximum drawdown magnitude `maximumDrawdown`	39.8789%
Ruin threshold reached `ruined`	No
Terminal wealth (multiple) `terminalWealth`	0.6748929
Share of periods below the peak `timeUnderWaterFraction`	99.0469%
Cumulative return `totalReturn`	-32.5107%

Circular block bootstrap

Metric	Minimum	Mean	Maximum	Quantiles
Longest losing streak (periods) `longestLosingStreak`	6	9.886	20	5% = 7 · 50% = 10 · 95% = 14
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	323	1120.405	1259	5% = 676.9 · 50% = 1208.5 · 95% = 1259
Maximum drawdown magnitude `maximumDrawdown`	12.1155%	37.5435%	73.0095%	5% = 20.6695% · 50% = 37.8218% · 95% = 54.2609%
Probability of reaching the ruin threshold `ruinProbability`		9.2%		
Terminal wealth (multiple) `terminalWealth`	0.2699051	0.6909612	1.245536	5% = 0.475839 · 50% = 0.6746492 · 95% = 0.9603007
Share of periods below the peak `timeUnderWaterFraction`	93.8046%	99.081%	100%	5% = 97.0612% · 50% = 99.3646% · 95% = 100%
Cumulative return `totalReturn`	-73.0095%	-30.9039%	24.5536%	5% = -52.4161% · 50% = -32.5351% · 95% = -3.96993%

Return-order permutation

Metric	Minimum	Mean	Maximum	Quantiles
Longest losing streak (periods) `longestLosingStreak`	6	8.948	20	5% = 7 · 50% = 9 · 95% = 12
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	463	1140.33	1259	5% = 823.95 · 50% = 1203.5 · 95% = 1259
Maximum drawdown magnitude `maximumDrawdown`	32.5107%	38.7987%	50.7374%	5% = 33.6232% · 50% = 38.4548% · 95% = 45.0303%
Probability of reaching the ruin threshold `ruinProbability`		0%		
Share of periods below the peak `timeUnderWaterFraction`	95.1549%	99.0059%	100%	5% = 97.22% · 50% = 99.2851% · 95% = 100%

Simulation settings and bindings

Field	Value
`simulationSchemaVersion`	strateva-simulation-evidence/v2

Simulation settings and bindings	
Field	**Value**
`engineVersion`	0.9.0
`kernelVersion`	1.1.0
`observationCount`	1259
`strategyTraceHash`	`85aadf7320e7e245df580921bde5f69d3b2e9e585c83773cab8ae91bd688c978`
`contentHash`	`6cee9398049926a14427e2fe896162420066b04615ba2e5cc1fda360fac85c72`
Block length `configuration.blockLength`	5
Initial wealth `configuration.initialWealth`	1
`configuration.quantiles`	5% · 50% · 95%
Replications `configuration.repetitions`	1000
Ruin threshold (share of initial wealth) `configuration.ruinWealthFraction`	50%
Seed `configuration.seed`	42
`classic.method`	CIRCULAR_MOVING_BLOCK_BOOTSTRAP
`classic.sampling`	WITH_REPLACEMENT
`permuted.method`	FISHER_YATES_RETURN_ORDER_PERMUTATION
`permuted.sampling`	WITHOUT_REPLACEMENT
Terminal wealth (multiple) `permuted.terminalWealth`	0.6748929
Terminal wealth invariant `permuted.terminalWealthInvariant`	Yes

Provenance and traceability

Evidence and input hashes	
Field	**Value**
`bundleSchemaVersion`	strateva-evidence-bundle/v3
`artifactId`	`urn:strateva:strategy-trace:85aadf7320e7e245df580921bde5f69d3b2e9e585c83773cab8ae91bd688c978`
`engineVersion`	0.9.0
`kernelVersion`	1.1.0
`generatedAt`	2026-11-17T12:51:06Z
`contentHash`	`1258bc323c7e6c8cea433da74613c35f84cd4c4d06fb6b84ae4976e337a656aa`
Benchmark return series hash `inputHashes.benchmarkReturns`	60877fda2df42c81f8b80e4334e84555ec363983fb6b03be2e8edfa78be6dff5
Strategy return series hash `inputHashes.strategyReturns`	dd15a243d74cf339b381c2c7b892d2505d6937bb831bac87cf9ef2b1dcf94295

Evidence and input hashes	
Field	**Value**
`lineage`	strategyTrace:85aadf7320e7e245df580921bde5f69d3b2e9e585c83773cab8ae91bd688c978 · scope:72eb420ff05cb5700ed9acfa068e048e52be28e568f237ab3937b8aef974a849 · artifact:f1120efdb874a68960f1a003c0fbe91816ad2f3e17c01f5db1a03f9bb977f232 · data:91814fb98e4fac80224c80d62b79bec6f1130a9e3607857e3a64133a19ee8244

Provenance statement	
Field	**Value**
`claim`	development
`containerImageDigest`	N/A
`engineCommit`	N/A
`freezeHash`	N/A
`runId`	N/A

Evidence signature · No evidence supplied.

StrategyTrace · Identity, frequency, conventions and benchmark	
Field	**Value**
`artifactContentHash`	`f1120efdb874a68960f1a003c0fbe91816ad2f3e17c01f5db1a03f9bb977f232`
`benchmark.kind`	SERIES
`benchmark.symbol`	URTH
`contentHash`	`85aadf7320e7e245df580921bde5f69d3b2e9e585c83773cab8ae91bd688c978`
`conventions.costs`	RETURN_FRACTION
`conventions.exposure`	FRACTION_OF_EQUITY
`conventions.returnType`	SIMPLE
`conventions.returnUnit`	FRACTION
`conventions.timestampMeaning`	UTC_PERIOD_END
`conventions.turnover`	SUM_ABSOLUTE_POSITION_CHANGES
`dataContentHash`	`91814fb98e4fac80224c80d62b79bec6f1130a9e3607857e3a64133a19ee8244`
`engagementId`	eng-8169e5b0
`frequency.barInterval`	1d
`frequency.calendar`	XNYS
Periods per year `frequency.periodsPerYear`	252
`frequency.sourceTimezone`	America/New_York
`generatedAt`	2026-11-17T12:51:06Z
`runId`	frozen-source-replay-xgboost-regime-adaptive
`scopeContentHash`	`72eb420ff05cb5700ed9acfa068e048e52be28e568f237ab3937b8aef974a849`
`traceSchemaVersion`	strateva-strategy-trace/v1

Notes included in the evidence	
Field	**Value**
`disclosures`	The engine recomputed the metrics from verified StrategyTrace net returns. · Monte Carlo has its own hash. It affects criteria only if preregistered for that purpose.