Bayesian hierarchical risk parity, 20 stocks

Strategy evaluated · **Nivel de evidencia** Histórico · Development · Sample 2014-01-06 14:30:00+00:00 to 2018-12-31 14:30:00+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. Historical universe membership is missing (SURVIVORSHIP_BIAS_NOT_CONTROLLED).

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 evidence does not say whether Strateva used AI in the review.

Advice. This report does not constitute investment advice.

Performance and risk

Absolute performance · Strategy and benchmark

Metric	Strategy	Benchmark
Observations `n_obs`	1256	1256
Periods per year `annualization`	252	252
Annual risk-free rate `risk_free_annual`	0%	0%
Cumulative return `total_return`	12.5628%	13.7311%
Annualized compound return (CAGR) `cagr`	2.40278%	2.61514%
Annualized arithmetic return `annual_return_arithmetic`	3.0814%	3.74256%
Annualized volatility `annual_volatility`	11.8688%	15.2038%
Sharpe `sharpe`	0.2596223	0.2461595
Sortino `sortino`	0.3528975	0.335707
Maximum drawdown `max_drawdown`	-19.6667%	-21.1862%
Periods to the maximum drawdown trough `max_drawdown_underwater_periods`	229	185
Periods from the previous peak to recovery `max_drawdown_recovery_periods`	N/A	444
Calmar `calmar`	0.1221747	0.123436
Share of positive periods `positive_period_rate`	53.3439%	52.0701%
Alias for the share of positive periods `hit_rate`	53.3439%	52.0701%

Absolute performance · Strategy and benchmark		
Metric	**Strategy**	**Benchmark**
Skewness `skewness`	-0.8365117	-0.7721198
Excess kurtosis `excess_kurtosis`	12.30101	7.066264

Active performance · Strategy versus benchmark	
Field	**Value**
Observations `n_obs`	1256
Periods per year `annualization`	252
Annual risk-free rate `risk_free_annual`	0%
Annualized active return `active_return_annual`	-0.661161%
Annualized tracking error `tracking_error_annual`	10.4688%
Information ratio `information_ratio`	-0.06315545
Correlation with the benchmark `correlation`	0.7271464
Beta `beta`	0.5676434
Annualized regression alpha `regression_alpha_annual`	0.95696%
Annualized Jensen alpha `jensen_alpha_annual`	0.95696%
Strategy Sharpe ratio `strategy_sharpe`	0.2596223
Benchmark Sharpe ratio `benchmark_sharpe`	0.2461595

Statistical uncertainty

Strategy · Mean excess return · HAC	
Field	**Value**
Status `status`	evaluated
Observations `n_obs`	1256
Lags `lags`	7
Weighting kernel `kernel`	bartlett
Estimate per period `estimate`	0.0122278%
Annualized estimate `annualized_estimate`	3.0814%
Standard error `standard_error`	0.019127%
Annualized standard error `annualized_standard_error`	4.82002%

Strategy · Mean excess return · HAC	
Field	**Value**
t-statistic `t_stat`	0.6392923
Two-sided p-value (normal) `p_value_two_sided_normal`	0.5226328

Strategy · Sharpe ratio interval · block bootstrap	
Field	**Value**
Observations `n_obs`	1256
Block length `block_length`	11
Replications `repetitions`	1000
Seed `seed`	20261117
Confidence level `confidence`	95%
Lower-tail probability `lower_probability`	2.5%
Upper-tail probability `upper_probability`	97.5%
Replications attempted `attempted_repetitions`	1000
Valid replications `valid_repetitions`	1000
Replications with no defined estimate `undefined_repetitions`	0
Status `status`	evaluated
Point estimate `point_estimate`	0.2596223
Standard error `standard_error`	0.4072605
Lower interval bound `ci_lower`	-0.5100196
Upper interval bound `ci_upper`	1.082961

Benchmark · No uncertainty estimate supplied.

Active performance · Mean active return · HAC	
Field	**Value**
Status `status`	evaluated
Observations `n_obs`	1256
Lags `lags`	7
Weighting kernel `kernel`	bartlett
Estimate per period `estimate`	-0.00262366%

Active performance · Mean active return · HAC	
Field	**Value**
Annualized estimate `annualized_estimate`	-0.661161%
Standard error `standard_error`	0.0131285%
Annualized standard error `annualized_standard_error`	3.30839%
t-statistic `t_stat`	-0.1998441
Two-sided p-value (normal) `p_value_two_sided_normal`	0.8416025

Active performance · Information ratio interval · block bootstrap	
Field	**Value**
Observations `n_obs`	1256
Block length `block_length`	11
Replications `repetitions`	1000
Seed `seed`	20261117
Confidence level `confidence`	95%
Lower-tail probability `lower_probability`	2.5%
Upper-tail probability `upper_probability`	97.5%
Replications attempted `attempted_repetitions`	1000
Valid replications `valid_repetitions`	1000
Replications with no defined estimate `undefined_repetitions`	0
Status `status`	evaluated
Point estimate `point_estimate`	-0.06315545
Standard error `standard_error`	0.3164531
Lower interval bound `ci_lower`	-0.6961922
Upper interval bound `ci_upper`	0.5660799

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**
Periods per year `annualization`	252
Annualization method `annualizationMethod`	declared by StrategyTrace.frequency.periodsPerYear
Annual risk-free rate `riskFreeAnnual`	0%
`allowPositional`	No
`timezone`	UTC
`calendar`	NYSE
Confidence level `uncertainty.confidence`	95%
`uncertainty.hacLagPolicy.kind`	sample-size-bartlett-v1
`uncertainty.timeBasis.kind`	session-grid
Expected calendar hash `uncertainty.timeBasis.expectedEndsHash`	`5fdbb72fd54bf354345d44331920146a29cab0e3da74b0edb3275e32060ae752`
Block length `uncertainty.blockLength`	11
Replications `uncertainty.repetitions`	1000
Seed `uncertainty.seed`	20261117

Monte Carlo

Observed path

Field	Value
Terminal wealth (multiple) `terminalWealth`	1.125628
Cumulative return `totalReturn`	12.5628%
Maximum drawdown magnitude `maximumDrawdown`	19.6667%
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	337
Share of periods below the peak `timeUnderWaterFraction`	91.879%
Longest losing streak (periods) `longestLosingStreak`	10
Ruin threshold reached `ruined`	No

Circular block bootstrap

Metric	Minimum	Mean	Maximum	Quantiles
Terminal wealth (multiple) `terminalWealth`	0.5207634	1.161975	2.756847	5% = 0.7566452 · 50% = 1.142675 · 95% = 1.637142
Cumulative return `totalReturn`	-47.9237%	16.1975%	175.685%	5% = -24.3355% · 50% = 14.2675% · 95% = 63.7142%
Maximum drawdown magnitude `maximumDrawdown`	7.4274%	21.772%	54.8154%	5% = 11.8773% · 50% = 20.2106% · 95% = 36.6942%
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	98	655.883	1256	5% = 217.95 · 50% = 591 · 95% = 1226.05
Share of periods below the peak `timeUnderWaterFraction`	81.6083%	94.7895%	100%	5% = 88.6943% · 50% = 95.1831% · 95% = 99.2834%
Longest losing streak (periods) `longestLosingStreak`	6	9.399	17	5% = 7 · 50% = 9 · 95% = 13
Probability of reaching the ruin threshold `ruinProbability`		0.2%		

Return-order permutation

Metric	Minimum	Mean	Maximum	Quantiles
Maximum drawdown magnitude `maximumDrawdown`	10.6782%	22.621%	40.2387%	5% = 15.0397% · 50% = 21.8633% · 95% = 32.8758%
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	164	673.89	1186	5% = 334 · 50% = 654 · 95% = 1062.2
Share of periods below the peak `timeUnderWaterFraction`	90.9236%	96.1569%	98.7261%	5% = 93.4713% · 50% = 96.3376% · 95% = 98.0096%
Longest losing streak (periods) `longestLosingStreak`	5	8.797	17	5% = 7 · 50% = 9 · 95% = 12
Probability of reaching the ruin threshold `ruinProbability`		0%		

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`	1256
`strategyTraceHash`	`8c51a8001ba8a3c5e7a9a3ed1d153e71e39f81fd6e7e152a9f2cdbb607974278`
`contentHash`	`0f143a2d74981c2789983d24253ecc05c16e5f789d801d8f88067b9a3b124a5e`
Replications `configuration.repetitions`	1000
Seed `configuration.seed`	20261117
Block length `configuration.blockLength`	11
Initial wealth `configuration.initialWealth`	1
Ruin threshold (share of initial wealth) `configuration.ruinWealthFraction`	50%
`configuration.quantiles`	5% · 50% · 95%
`classic.method`	CIRCULAR_MOVING_BLOCK_BOOTSTRAP
`classic.sampling`	WITH_REPLACEMENT
`permuted.method`	FISHER_YATES_RETURN_ORDER_PERMUTATION
`permuted.sampling`	WITHOUT_REPLACEMENT
Terminal wealth invariant `permuted.terminalWealthInvariant`	Yes
Terminal wealth (multiple) `permuted.terminalWealth`	1.125628

Provenance and traceability

Evidence and input hashes	
Field	**Value**
`bundleSchemaVersion`	strateva-evidence-bundle/v3
`artifactId`	`urn:strateva:strategy-trace:8c51a8001ba8a3c5e7a9a3ed1d153e71e39f81fd6e7e152a9f2cdbb607974278`
`engineVersion`	0.9.0
`kernelVersion`	1.1.0
`generatedAt`	2026-11-17T18:25:47Z
`contentHash`	`559dca772f633dfd4f152ea7a7a6929ca2c1ec5f8a3e57a482f4fcb44069981b`
Strategy return series hash `inputHashes.strategyReturns`	bd8d25d50f73e48dfc8fc64cf089bbc9fa61ff83d5afb3ecec64283523018762
Benchmark return series hash `inputHashes.benchmarkReturns`	fe07bf7578e9361e19346166409f32ae7a1e63388881bb5c5f584c0bee485fa3

Evidence and input hashes	
Field	**Value**
`lineage`	strategyTrace:8c51a8001ba8a3c5e7a9a3ed1d153e71e39f81fd6e7e152a9f2cdbb607974278 · scope:c684d59489092708b1cd491ec7743a984e4b843f7f082c3294633063ee44abcb · artifact:8650f1caf3583cd204e7851bbec4d098d955680d7c46cea23049622a30f0ccf2 · data:df90cc5e174b5dc100507e3d1da924fd52090c1a8ff2dcc6f0e3c53c2b10d586

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

Evidence signature · No evidence supplied.

StrategyTrace · Identity, frequency, conventions and benchmark	
Field	**Value**
`traceSchemaVersion`	strateva-strategy-trace/v1
`engagementId`	eng-e1dd59fa
`runId`	bayesian-hierarchical-risk-parity-ft-2013
`generatedAt`	2026-11-17T18:25:47Z
`scopeContentHash`	`c684d59489092708b1cd491ec7743a984e4b843f7f082c3294633063ee44abcb`
`artifactContentHash`	`8650f1caf3583cd204e7851bbec4d098d955680d7c46cea23049622a30f0ccf2`
`dataContentHash`	`df90cc5e174b5dc100507e3d1da924fd52090c1a8ff2dcc6f0e3c53c2b10d586`
`frequency.barInterval`	1d
Periods per year `frequency.periodsPerYear`	252
`frequency.calendar`	NYSE
`frequency.sourceTimezone`	America/New_York
`conventions.returnType`	SIMPLE
`conventions.returnUnit`	FRACTION
`conventions.timestampMeaning`	UTC_PERIOD_END
`conventions.turnover`	SUM_ABSOLUTE_POSITION_CHANGES
`conventions.exposure`	FRACTION_OF_EQUITY
`conventions.costs`	RETURN_FRACTION
`benchmark.kind`	SERIES
`benchmark.symbol`	URTH
`contentHash`	`8c51a8001ba8a3c5e7a9a3ed1d153e71e39f81fd6e7e152a9f2cdbb607974278`

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.