Volatility regimes and the QQQ portfolio

> **Strategy evaluated** · **Nivel de evidencia** Histórico · Development · Sample 2019-01-03 21:00:00+00:00 to 2024-12-31 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. 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`	1509	1509
Periods per year `annualization`	252	252
Annual risk-free rate `risk_free_annual`	2%	2%
Cumulative return `total_return`	26.4838%	118.855%
Annualized compound return (CAGR) `cagr`	4.0015%	13.9739%
Annualized arithmetic return `annual_return_arithmetic`	4.45311%	14.9409%
Annualized volatility `annual_volatility`	10.2877%	19.2103%
Sharpe `sharpe`	0.2403619	0.6746672
Sortino `sortino`	0.333491	0.9313826
Maximum drawdown `max_drawdown`	-20.0252%	-34.009%
Periods to the maximum drawdown trough `max_drawdown_underwater_periods`	377	27
Periods from the previous peak to recovery `max_drawdown_recovery_periods`	698	134
Calmar `calmar`	0.199823	0.4108883
Share of positive periods `positive_period_rate`	60.835%	55.2021%
Alias for the share of positive periods `hit_rate`	60.835%	55.2021%

Absolute performance · Strategy and benchmark		
Metric	**Strategy**	**Benchmark**
Skewness `skewness`	-0.1817633	-0.8205306
Excess kurtosis `excess_kurtosis`	9.854429	15.50066

Active performance · Strategy versus benchmark	
Field	**Value**
Observations `n_obs`	1509
Periods per year `annualization`	252
Annual risk-free rate `risk_free_annual`	2%
Annualized active return `active_return_annual`	-10.4878%
Annualized tracking error `tracking_error_annual`	18.7734%
Information ratio `information_ratio`	-0.5586501
Correlation with the benchmark `correlation`	0.3097461
Beta `beta`	0.1658785
Annualized regression alpha `regression_alpha_annual`	1.97474%
Annualized Jensen alpha `jensen_alpha_annual`	0.322893%
Strategy Sharpe ratio `strategy_sharpe`	0.2403619
Benchmark Sharpe ratio `benchmark_sharpe`	0.6746672

Statistical uncertainty

Strategy · Mean excess return · HAC	
Field	**Value**
Status `status`	evaluated
Observations `n_obs`	1509
Lags `lags`	7
Weighting kernel `kernel`	bartlett
Estimate per period `estimate`	0.00981257%
Annualized estimate `annualized_estimate`	2.47277%
Standard error `standard_error`	0.0147961%
Annualized standard error `annualized_standard_error`	3.72861%

Strategy · Mean excess return · HAC	
Field	**Value**
t-statistic `t_stat`	0.6631879
Two-sided p-value (normal) `p_value_two_sided_normal`	0.5072102

Strategy · Sharpe ratio interval · block bootstrap	
Field	**Value**
Observations `n_obs`	1509
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`	0.2403619
Standard error `standard_error`	0.3780745
Lower interval bound `ci_lower`	-0.4689173
Upper interval bound `ci_upper`	0.964732

Benchmark · No uncertainty estimate supplied.

Active performance · Mean active return · HAC	
Field	**Value**
Status `status`	evaluated
Observations `n_obs`	1509
Lags `lags`	7
Weighting kernel `kernel`	bartlett
Estimate per period `estimate`	-0.0416181%

Active performance · Mean active return · HAC	
Field	**Value**
Annualized estimate `annualized_estimate`	-10.4878%
Standard error `standard_error`	0.0284573%
Annualized standard error `annualized_standard_error`	7.17124%
t-statistic `t_stat`	-1.462476
Two-sided p-value (normal) `p_value_two_sided_normal`	0.1436109

Active performance · Information ratio interval · block bootstrap	
Field	**Value**
Observations `n_obs`	1509
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`	-0.5586501
Standard error `standard_error`	0.4182283
Lower interval bound `ci_lower`	-1.45752
Upper interval bound `ci_upper`	0.1669861

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`	2%
`allowPositional`	No
`timezone`	UTC
`calendar`	XNYS
Confidence level `uncertainty.confidence`	95%
`uncertainty.hacLagPolicy.kind`	sample-size-bartlett-v1
`uncertainty.timeBasis.kind`	session-grid
Expected calendar hash `uncertainty.timeBasis.expectedEndsHash`	`87aa945d00ffa170aaa45c75a670999c321c9925f0b1e2dff580bf145d5457a1`
Block length `uncertainty.blockLength`	11
Replications `uncertainty.repetitions`	1000
Seed `uncertainty.seed`	20261117

Monte Carlo

Observed path

Field	Value
Terminal wealth (multiple) `terminalWealth`	1.264838
Cumulative return `totalReturn`	26.4838%
Maximum drawdown magnitude `maximumDrawdown`	20.0252%
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	697
Share of periods below the peak `timeUnderWaterFraction`	78.9927%
Longest losing streak (periods) `longestLosingStreak`	16
Ruin threshold reached `ruined`	No

Circular block bootstrap

Metric	Minimum	Mean	Maximum	Quantiles
Terminal wealth (multiple) `terminalWealth`	0.5786288	1.305568	2.559588	5% = 0.8626097 · 50% = 1.279969 · 95% = 1.825556
Cumulative return `totalReturn`	-42.1371%	30.5568%	155.959%	5% = -13.739% · 50% = 27.9969% · 95% = 82.5556%
Maximum drawdown magnitude `maximumDrawdown`	7.30766%	18.2502%	47.244%	5% = 10.3937% · 50% = 16.9204% · 95% = 31.0528%
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	117	656.696	1507	5% = 220.95 · 50% = 569 · 95% = 1387.45
Share of periods below the peak `timeUnderWaterFraction`	80.1856%	93.764%	99.9337%	5% = 87.2763% · 50% = 94.1352% · 95% = 99.006%
Longest losing streak (periods) `longestLosingStreak`	5	10.117	24	5% = 6 · 50% = 10 · 95% = 15
Probability of reaching the ruin threshold `ruinProbability`		0%		

Return-order permutation

Metric	Minimum	Mean	Maximum	Quantiles
Maximum drawdown magnitude `maximumDrawdown`	9.39638%	19.0046%	39.4751%	5% = 12.7747% · 50% = 18.2402% · 95% = 26.9078%
Longest stretch below the peak (periods) `longestUnderwaterStreakPeriods`	189	650.173	1418	5% = 326.95 · 50% = 626.5 · 95% = 1080.5
Share of periods below the peak `timeUnderWaterFraction`	89.662%	94.5951%	97.7469%	5% = 92.3128% · 50% = 94.7647% · 95% = 96.3552%
Longest losing streak (periods) `longestLosingStreak`	5	7.48	14	5% = 6 · 50% = 7 · 95% = 10
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`	1509
`strategyTraceHash`	`df73d9e3548b9c0b0d857dd29a8a8196f9a621ff4fd45eae36a1a232931b55a2`
`contentHash`	`ef772eedbaae16196ae64121465c283397ecdeb3922100839df8463f26445522`
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`	1.264838

Provenance and traceability

Evidence and input hashes	
Field	**Value**
`bundleSchemaVersion`	strateva-evidence-bundle/v3
`artifactId`	`urn:strateva:strategy-trace:df73d9e3548b9c0b0d857dd29a8a8196f9a621ff4fd45eae36a1a232931b55a2`
`engineVersion`	0.9.0
`kernelVersion`	1.1.0
`generatedAt`	2026-11-17T17:05:34Z
`contentHash`	`78b35f9d06a30dad1b5465388a443933b09b2ec3b276fa2140b8ab2ad227b16c`
Strategy return series hash `inputHashes.strategyReturns`	844ccab52ff527867f94e0e80b9adf9ef48671d00cca27ab7cfccbed5919e0c8
Benchmark return series hash `inputHashes.benchmarkReturns`	308335b7bf16c1a57114ff300d6d7533125040fd63c8020f83e6d6e04ed4ebf3

Evidence and input hashes	
Field	**Value**
`lineage`	strategyTrace:df73d9e3548b9c0b0d857dd29a8a8196f9a621ff4fd45eae36a1a232931b55a2 · scope:9c8a3634006af32c7a6de6940a95c822b1234cce5f8ff84dbb69ef8df99e38a6 · artifact:843cfb8eb425d5ae5b890b4da089caaf215b6716eed8c3df170ec3452034482a · data:ebdee72b43de782b38bd91bc240ad7c4f4d130a51710100e3e0e2afe277407d3

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-843cfb8e
`runId`	qqq-regimes-aligned-urth-development
`generatedAt`	2026-11-17T17:05:34Z
`scopeContentHash`	`9c8a3634006af32c7a6de6940a95c822b1234cce5f8ff84dbb69ef8df99e38a6`
`artifactContentHash`	`843cfb8eb425d5ae5b890b4da089caaf215b6716eed8c3df170ec3452034482a`
`dataContentHash`	`ebdee72b43de782b38bd91bc240ad7c4f4d130a51710100e3e0e2afe277407d3`
`frequency.barInterval`	1d
Periods per year `frequency.periodsPerYear`	252
`frequency.calendar`	XNYS
`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`	`df73d9e3548b9c0b0d857dd29a8a8196f9a621ff4fd45eae36a1a232931b55a2`

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.