

Crypto Volatility Risk Premium: One Proxy Trial and a Published Null

Arhan Canli

Founder, System Architect, and Quantitative Researcher
Canli Capital / AlphaC Algorithms

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Research simulation and, where explicitly identified, Alpaca paper evidence. No funded performance, peer review, independent replication, external acceptance, or future return is claimed.

Short title: AlphaForge crypto VRP proxy lineage

Author: Arhan Canli, Founder, System Architect, and Quantitative Researcher, Canli Capital

Research system: ALPHAC / AlphaForge

Family key: `crypto_volatility_risk_premium`

Status: public research record; not peer reviewed; not an investment solicitation

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Abstract

AlphaForge tested one preregistered BTC/ETH volatility-risk-premium timing rule from 2021-03-24 through 2026-06-01. It compared Deribit DVOL closes with a seven-day Yang–Zhang realized-volatility estimate, entered only when the spread exceeded two volatility points, charged 10 basis points on signal turnover, and evaluated 1,492 expanding-window out-of-sample days after a 365-day warmup. The proxy produced annualized Sharpe -0.633, Deflated Sharpe Ratio 0.000, PSR 0.066, skew -9.517, and raw kurtosis 132.65. It failed.

The diagnostic also illustrates why average variance premium is not timing alpha. BTC's mean DVOL-minus-realized spread was +0.044 and positive on 72.99% of days; an always-short variance proxy showed Sharpe 2.4818 but skew -5.4874. ETH's corresponding always-short proxy showed Sharpe 0.5309 and skew -10.6795. Those attractive averages coexist with catastrophic left tails. This family is not a sleeve, is not in an Alpaca account, and has no broker-reconciled forward record.

Claim boundary

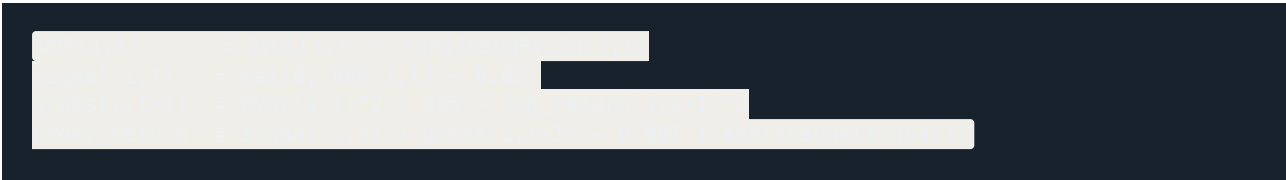
This paper establishes the economic question, exact historical proxy, one charged identity, persisted null, and source hashes. It does **not** establish executable option P&L, option-surface history, capacity, live execution, expected maximum drawdown, forward Sharpe, or future return. DVOL is an index and the variance-swap expression is a signal-validity proxy. It omits the option strip, tradable quotes and sizes, strike interpolation, margin, hedging, jumps, and gap execution.

Mechanism and falsifiable hypothesis

Option-implied variance can exceed subsequently realized variance because sellers of convex downside insurance require compensation. Carr and Wu formalize model-free variance-swap rates and document variance risk premia ([Review of Financial Studies](#)). That literature is a prior, not validation of AlphaForge's data, timing rule, or execution.

The tested hypothesis was narrower: a large positive difference between DVOL and recent realized volatility should identify days when short-variance compensation exceeds crash and trading costs. The hypothesis is falsified if the preregistered timing return is negative, remains deeply left-skewed, or fails selection adjustment. All three occurred.

For currency `i` and day `t`, the implementation was:



DVOL was stamped available after its source bar; realized volatility used only contemporaneously available OHLC. BTC and ETH proxy returns were equal weighted, normalized by a one-day-lagged expanding standard deviation, and scored only after the warmup. The direction was never inverted after seeing the result.

Complete trial accounting

The union contains exactly one identity in `crypto_volatility_risk_premium`:

Hypothesis key	Configuration hash	Observations	Sharpe	DSR	Decision
bd4688c240711a16	99596bbb5b6f8e38	1,492	-0.633	0.000	fail

The run originally used a global trial count of 84. The current union contains 228 identities; the historical DSR cannot be reconstructed honestly from rounded summary statistics alone and is therefore labeled artifact-era evidence, not a current-union restatement. The identity remains charged to the union regardless of its failure.

Result and risk interpretation

Measure	Persisted value
Annualized net proxy Sharpe	-0.633
Artifact-era DSR / PSR	0.000 / 0.066
Skew	-9.517
Raw kurtosis	132.65
OOS observations	1,492 days

No maximum drawdown was persisted for this summary-only proxy, so none is invented here. The extreme skew and kurtosis are more decision-relevant than the appealing always-short average. Timing failed to transform the premium into admissible expected return.

The historical proxy likely understates implementation difficulty. DVOL and seven-day realized volatility do not share a perfectly matched horizon; a variance-swap formula is not a fillable option strip; and the 10-basis-point signal-turnover charge is not a full options execution, hedging, and margin model. These limitations weaken positive claims. They do not rehabilitate a negative result.

Capacity, overlap, and sleeve decision

No options capacity sweep exists. There is no historical bid/ask surface, quote size, portfolio margin replay, delta-hedging ledger, or broker-reconciled forward option record. Capacity is **unmeasured**.

Short volatility is also not presumed diversifying. It can load on the same crash, liquidity, and deleveraging states that hurt carry and risky-asset trend books. The artifact left correlation against live sleeves pending; no independence claim is made.

Decision: FAIL / RESEARCH ONLY. Do not admit a VRP sleeve. A future return identity would need a separately preregistered, point-in-time options-surface implementation with executable quotes, defined-loss construction, hedging and margin costs, capacity, current-union deflation, and forward broker reconciliation. It would be a new charged trial, not a revision of this null.

Reproduction and authorship

- `scripts/exp2_crypto_vrp.py`: frozen proxy construction and original measurement driver.
- `artifacts/exp2/20260625T094710Z/exp2_metrics.json`: persisted historical report.
- `scripts/audit_crypto_vrp_family.py`: deterministic ledger-to-report audit.
- `artifacts/research/crypto_vrp_family.json`: generated family evidence packet.
- `/glassbox/crypto_vrp_family.json`: public machine packet.
- `/glassbox/trial_packet_manifest.json`: global identity join and remaining identity-level packet debt.

Reproduction requires the pinned AlphaForge environment and underlying Binance/Deribit data lake. The public packet exposes exact configuration, immutable keys, source paths, and SHA-256 hashes so that missing private market data is disclosed rather than confused with public byte reproducibility.

This research record and its ALPHAC implementation were authored and directed by **Arhan Canli**, Founder of Canli Capital. Authorship does not convert an internal result into peer review or independent verification.

Conclusion

The contribution is the rejection, not a strategy claim. A positive average crypto variance premium and a high naive Sharpe did not survive timing, costs, tail-risk inspection, or deflation. The honest sleeve count contributed by this family is zero.

References

1. Peter Carr, Liuren Wu (2009). *Variance Risk Premiums*. Review of Financial Studies.
<https://doi.org/10.1093/rfs/hhn038>