SIGNAL RESEARCH NOTE

# Range-Based Tail-Risk Monitor

Daily range and downside-state evidence for subsequent medium-horizon equity-market volatility.



Threshold Range Tail Risk | Secondary research | 21d preferred horizon

# Executive Summary

This note summarizes historical risk-state evidence for Range-Based Tail-Risk Monitor. Metrics describe the relationship between the recorded state and subsequent realized volatility; they are diagnostics, not portfolio returns or live recommendations.

| | |
|---|---|
| **Preferred horizon** | **21d** |
| **High-low volatility spread** | **12.83%** |
| **State-volatility IC** | **0.547** |
| **High-state realized volatility** | **23.14%** |
| **Average turnover** | **n/a** |

1. The preferred diagnostic horizon is 21d, where the recorded high-minus-low forward-volatility spread is 12.83%.
2. The state score has a positive Spearman relationship with subsequent realized volatility at 0.547.
3. The result is best read as a research-library risk diagnostic, not as a standalone product.

# Data and Research Setup

### UNIVERSE

Broad US equity-market exposure observed through a long daily history.

### INPUTS

Daily closing prices and high-low range information available at each historical observation date.

### CADENCE

Daily risk-state observations evaluated against subsequent 21d realized volatility.

### COMPARISON BASIS

Comparisons use the same universe and source assumptions inside each run. The note excludes instrument-level lists and live recommendations.

The source files were used for historical research extraction only. This note does not include instrument-level lists or position-level recommendations.

# Signal Methodology

Without disclosing the exact functional, the construction proceeds along three conceptual steps.

1. **Risk-state measurement.** Summarizes recent daily range and downside conditions into a comparable market-risk state.

2. **Historical state ordering.** Orders historical observations from lower to higher estimated risk without defining a standalone position rule.

3. **Forward-risk evaluation.** Evaluates whether higher-risk states are followed by greater realized volatility over the next 21 trading days.

The description is intentionally conceptual. Formula details, exact construction rules and implementation parameters are not disclosed.

# Results and Horizon Context

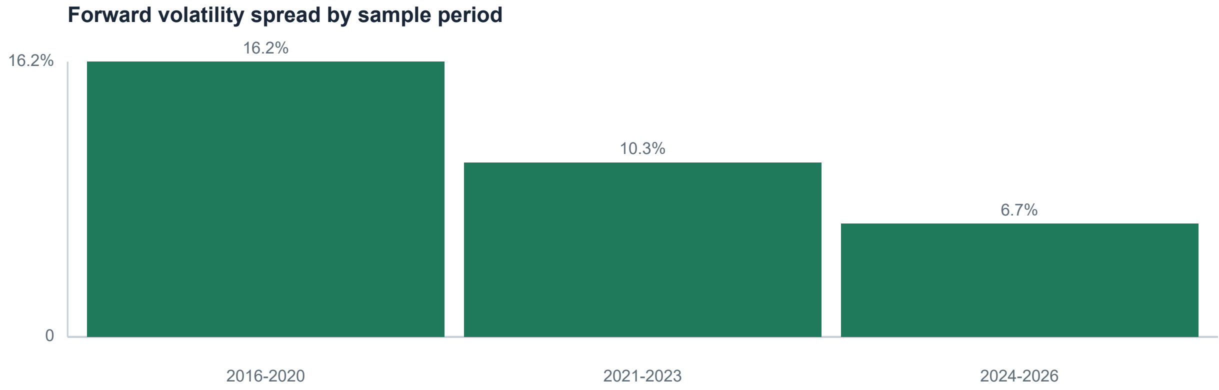


Figure 1. High-minus-low subsequent 21d realized-volatility spread across chronological sample periods. Forward 21d observations overlap, so the bars should be read as a risk-state diagnostic, not as a portfolio return.

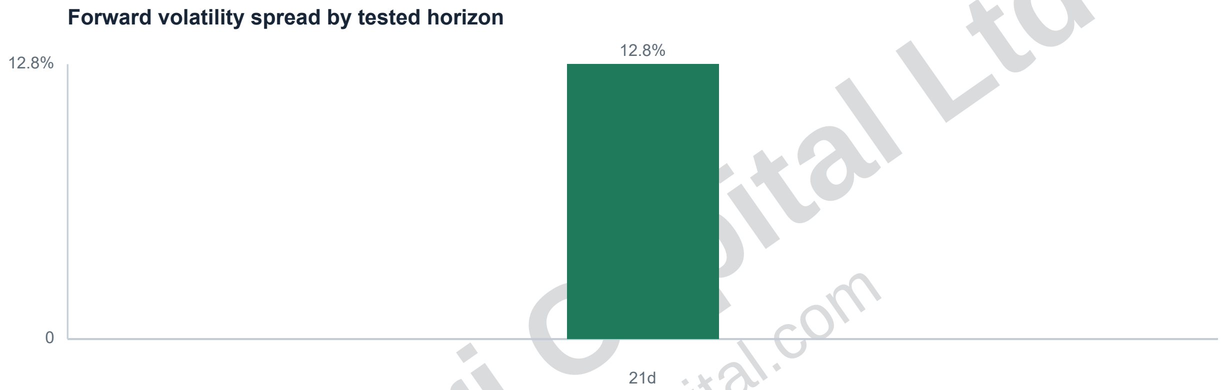


Figure 2. Forward realized-volatility separation across the tested horizons available in the source validation summary.

| Horizon | Volatility spread | State IC | High-state realized vol. | Turnover |
|---|---|---|---|---|
| **21d** | **12.83%** | **0.547** | **23.14%** | **n/a** |

# Stability and Robustness

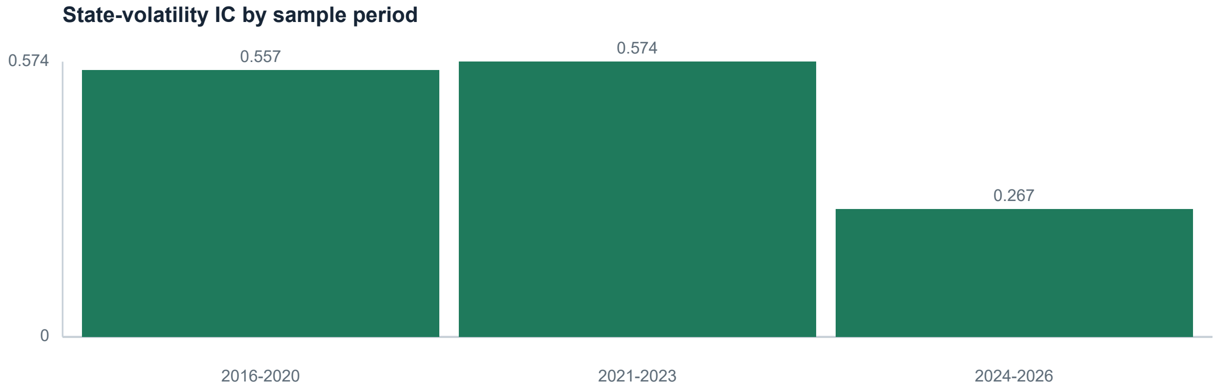


Figure 3. Spearman relationship between the risk-state score and subsequent 21d realized volatility across chronological sample periods.

The recorded spread is positive in 3 of 3 chronological sample periods.

| | |
|---|---|
| **Positive-year fraction** | **n/a** |
| **Universe size** | **1** |
| **Validation dates** | **2,536** |

# Research Interpretation

### ROLE IN RESEARCH LIBRARY

Secondary market-risk monitor inside the research library.

### WHAT IT CAPTURES

Variation in subsequent medium-horizon realized volatility associated with daily range and downside states.

### KNOWN LIMITATIONS

The evidence is an end-of-day proxy for a richer realized-measure framework. Forward 21d observations overlap, and the result is a risk diagnostic rather than a return series.

The evidence supports retaining the signal in the research library where it can be compared with related components under the same assumptions.