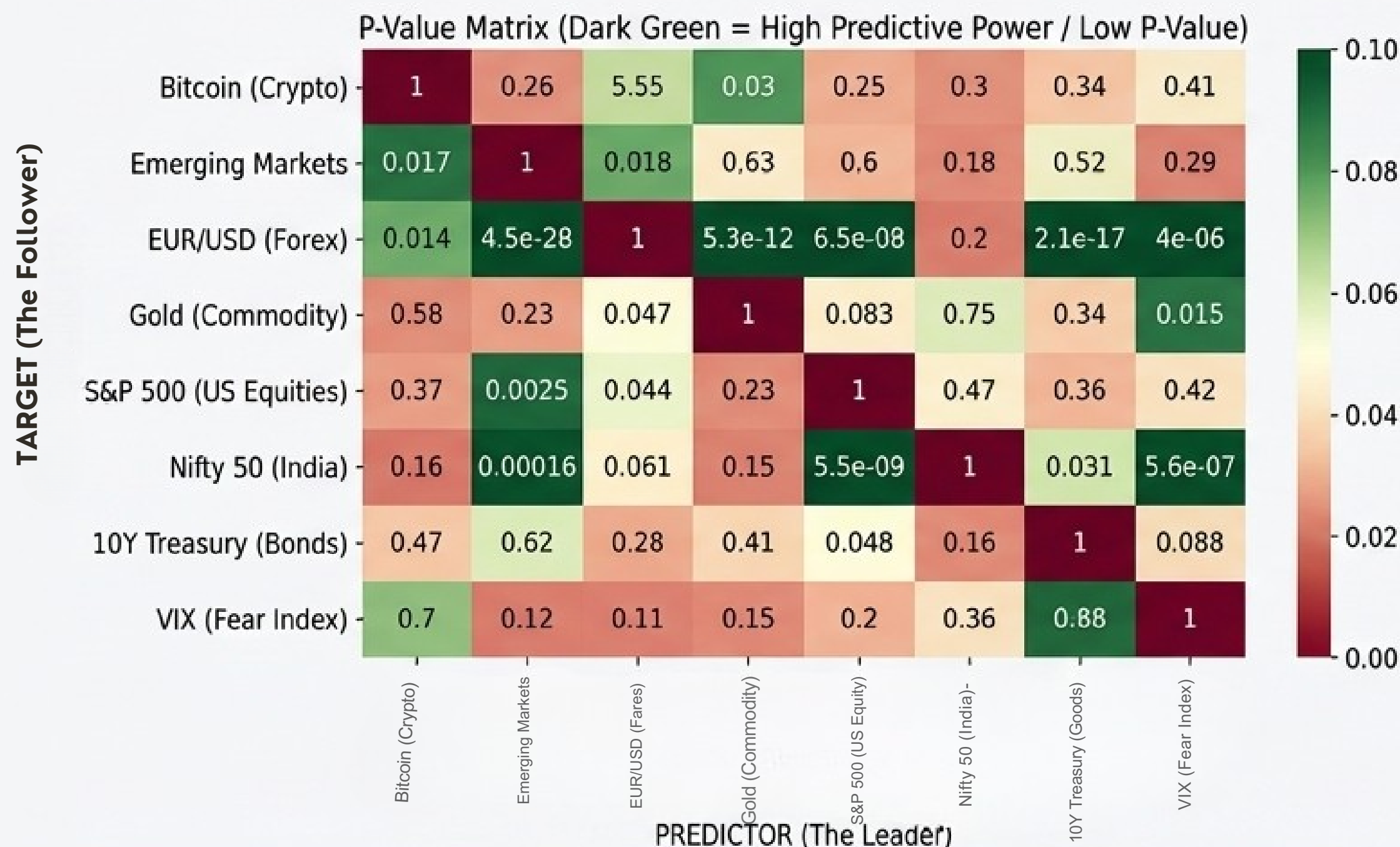


The Influence Matrix: Identifying the Market's True Leaders and Followers



How to Read This Chart

- This matrix shows the statistical significance of the predictive relationships.
- Dark green indicates strong predictive power (a low p-value).
- Rows are the TARGET (The Follower).
- Columns are the PREDICTOR (The Leader).

Key Insight

Look for columns with a lot of green. These are the assets that predict the movements of many others. In this analysis, **Emerging Markets** and the **VIX (Fear Index)** show significant influence across the board.

Stage II: Modeling the Global System to Forecast a Shock

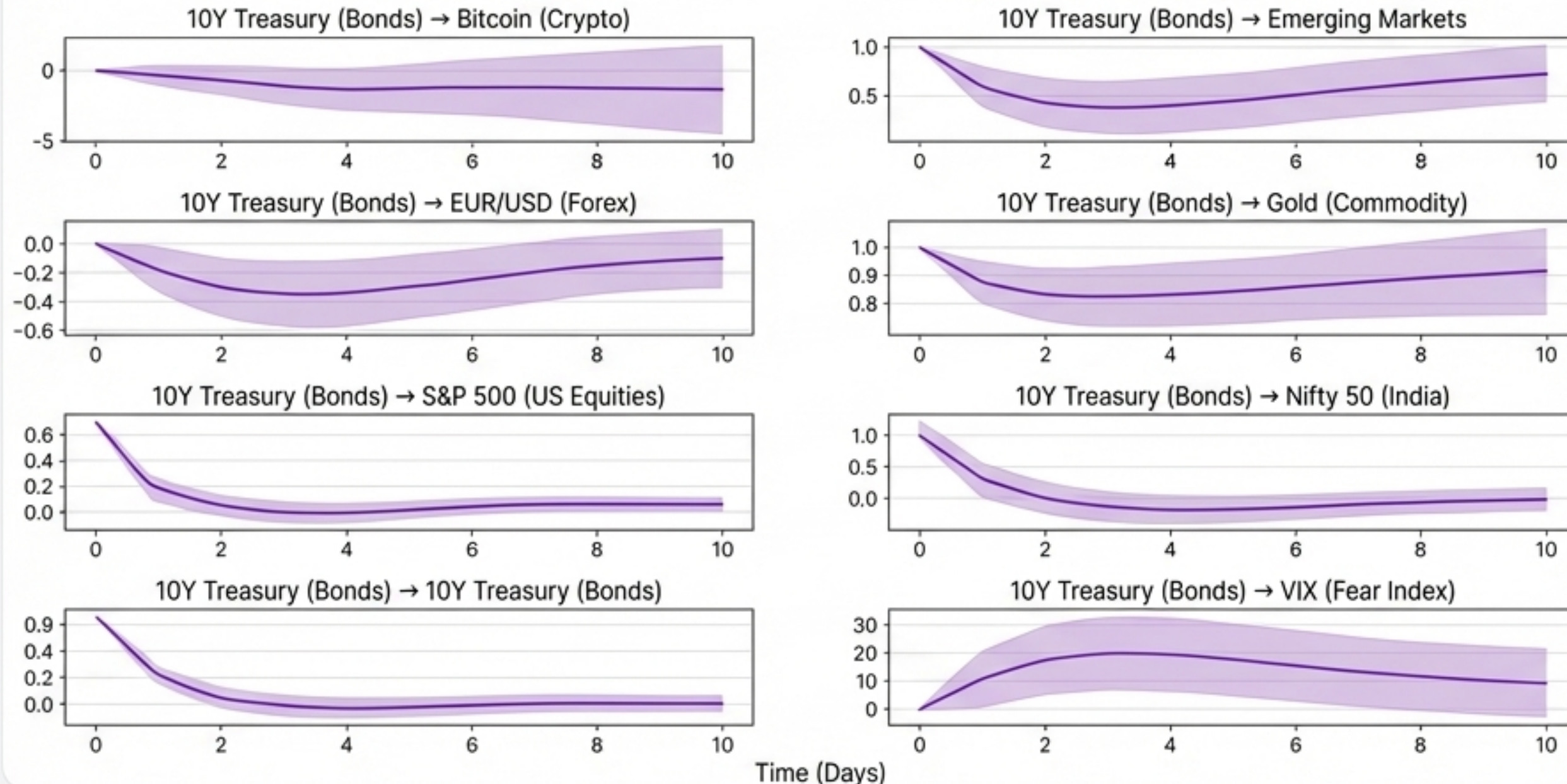
Concept

A Vector Autoregression (VAR) model is purpose-built for systems like this. It treats every asset's future return as a function of its own past returns *and* the past returns of all other assets in the system.

Scenario

We simulate a common market fear: 'What happens to all other assets when interest rates (10Y Treasury Yield) suddenly spike?'

Global Shock Analysis



Analysis

The plot shows the ripple effect of a shock to the 10Y Treasury on all other assets over 10 days. The dashed lines represent the confidence interval of the response.

****Key Takeaway****

We can observe the immediate negative response in assets like the S&P 500 and EUR/USD, quantifying the system's reaction to a rates shock.

Stage IV: Quantifying the “Distribution of Pain”

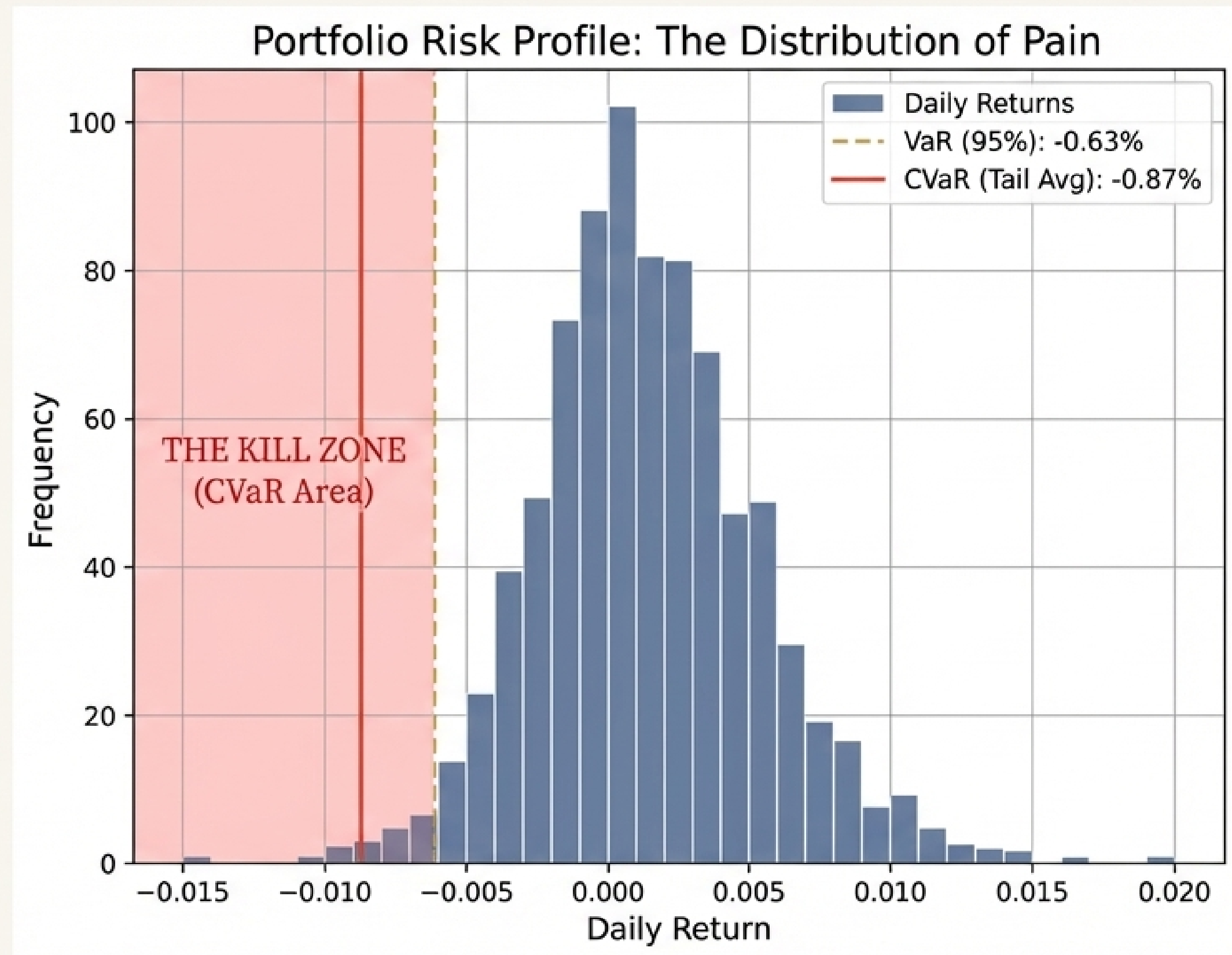
Key Risk Metrics (for a \$10M Portfolio)

Value at Risk (VaR 95%): -0.63%

There is a 5% chance of losing at least **\$62,578** on any given day.

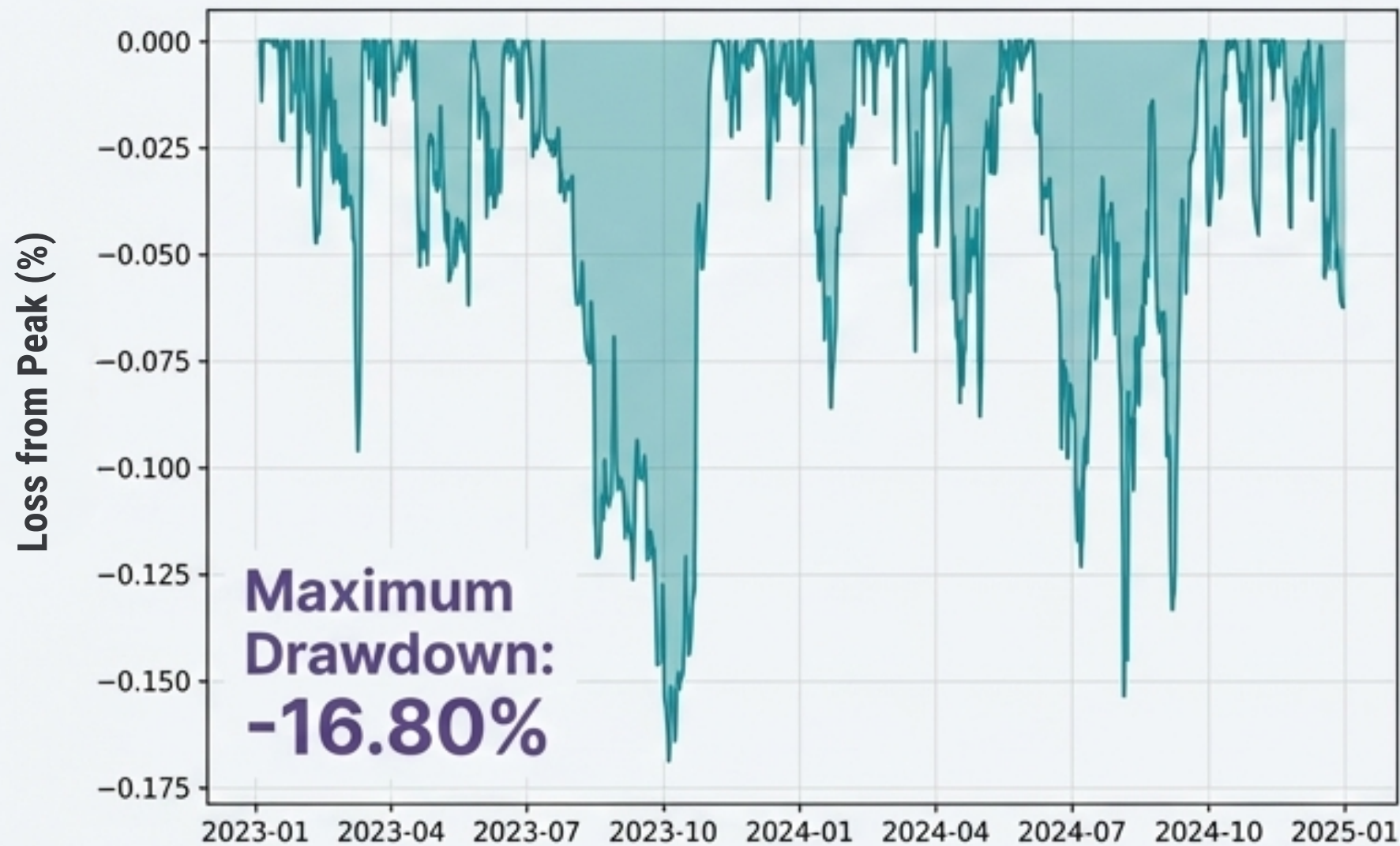
Conditional VaR (CVaR): -0.87%

If we have a day that bad (breaching the VaR), the average loss is expected to be **\$87,436**. This is the average of all outcomes in the "kill zone".



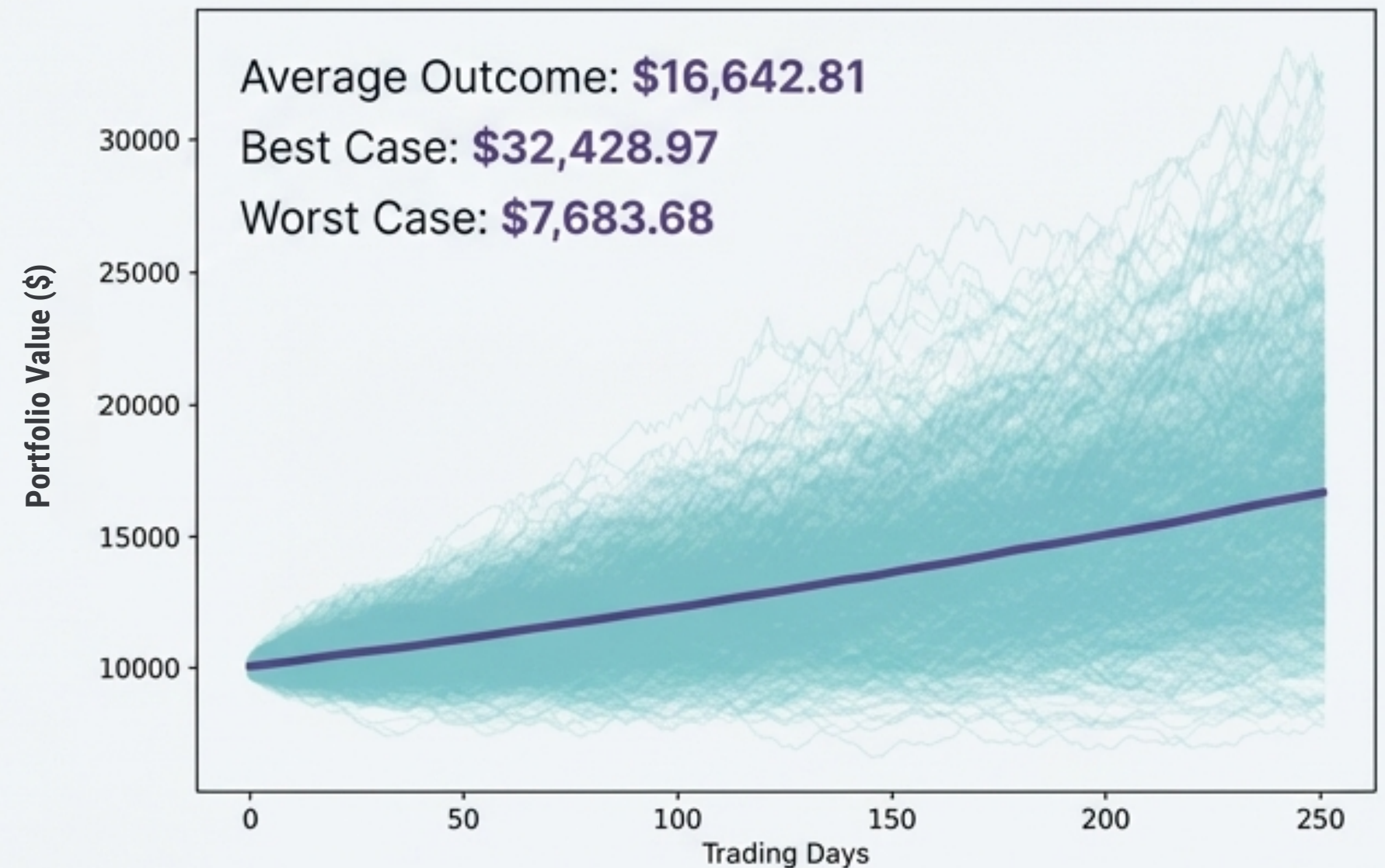
A full risk profile requires analyzing both historical drawdowns and the range of future possibilities.

Historical Performance Under Stress



At its worst point, the portfolio was down 16.80% from its previous peak value. This metric is crucial for understanding historical volatility.

Simulating Future Outcomes



Simulating 1,000 possible paths for the next year helps us quantify the potential range of returns and set realistic expectations.

Our model uses unsupervised learning to cluster market behavior into three distinct regimes.

Methodology

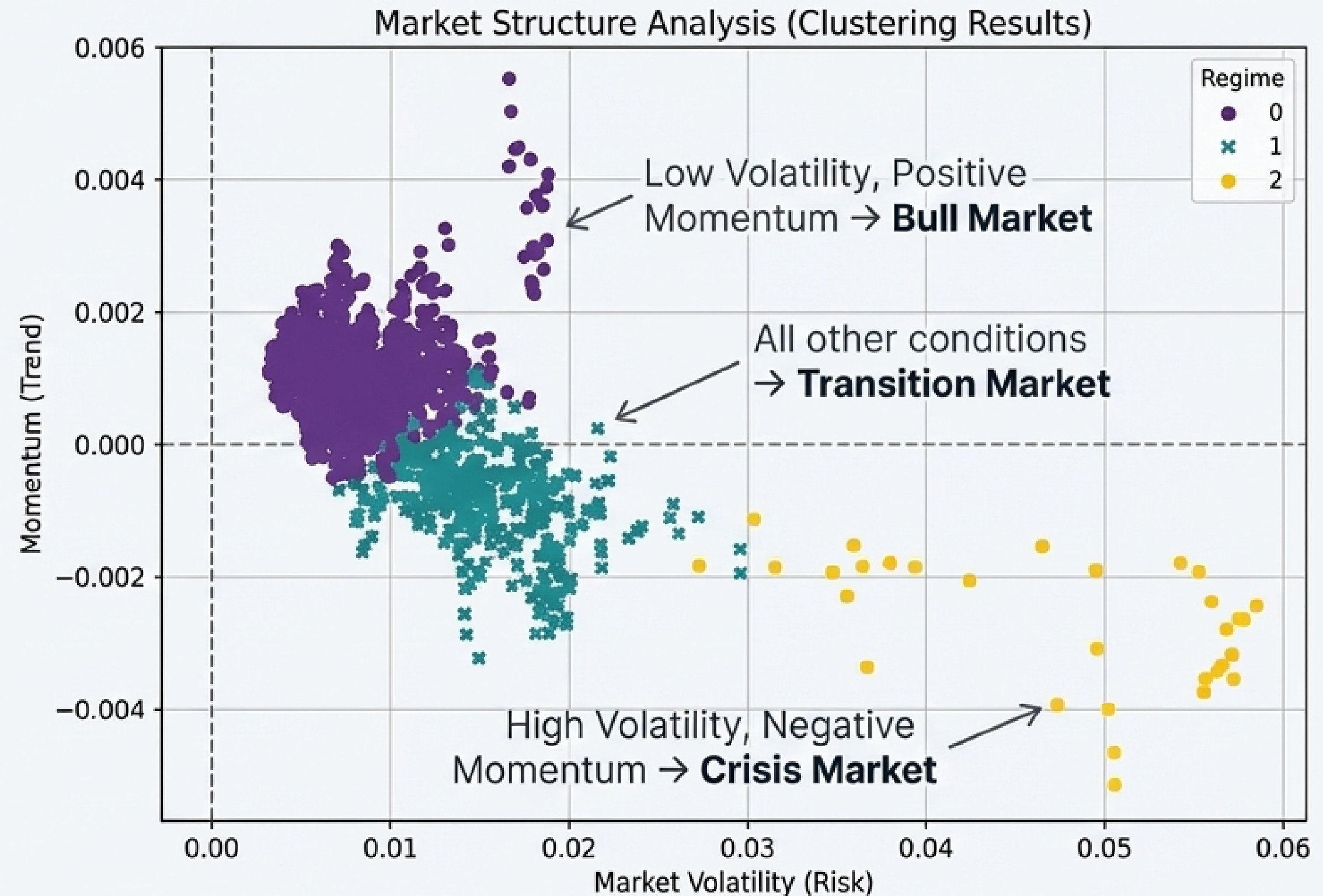
Inputs (Features)

The model isn't fed prices, but rather "market state" descriptors:

- **Market_Vol**: Rolling volatility of the S&P 500.
- **Momentum**: The S&P 500's quarterly trend.
- **VIX**: The market's "fear gauge".

Algorithm

K-Means clustering groups days with similar characteristics together without any human labels.



Our active strategy significantly outperformed the passive S&P 500 benchmark.

210.54%

Our Portfolio Return

53.80%

S&P 500 Return

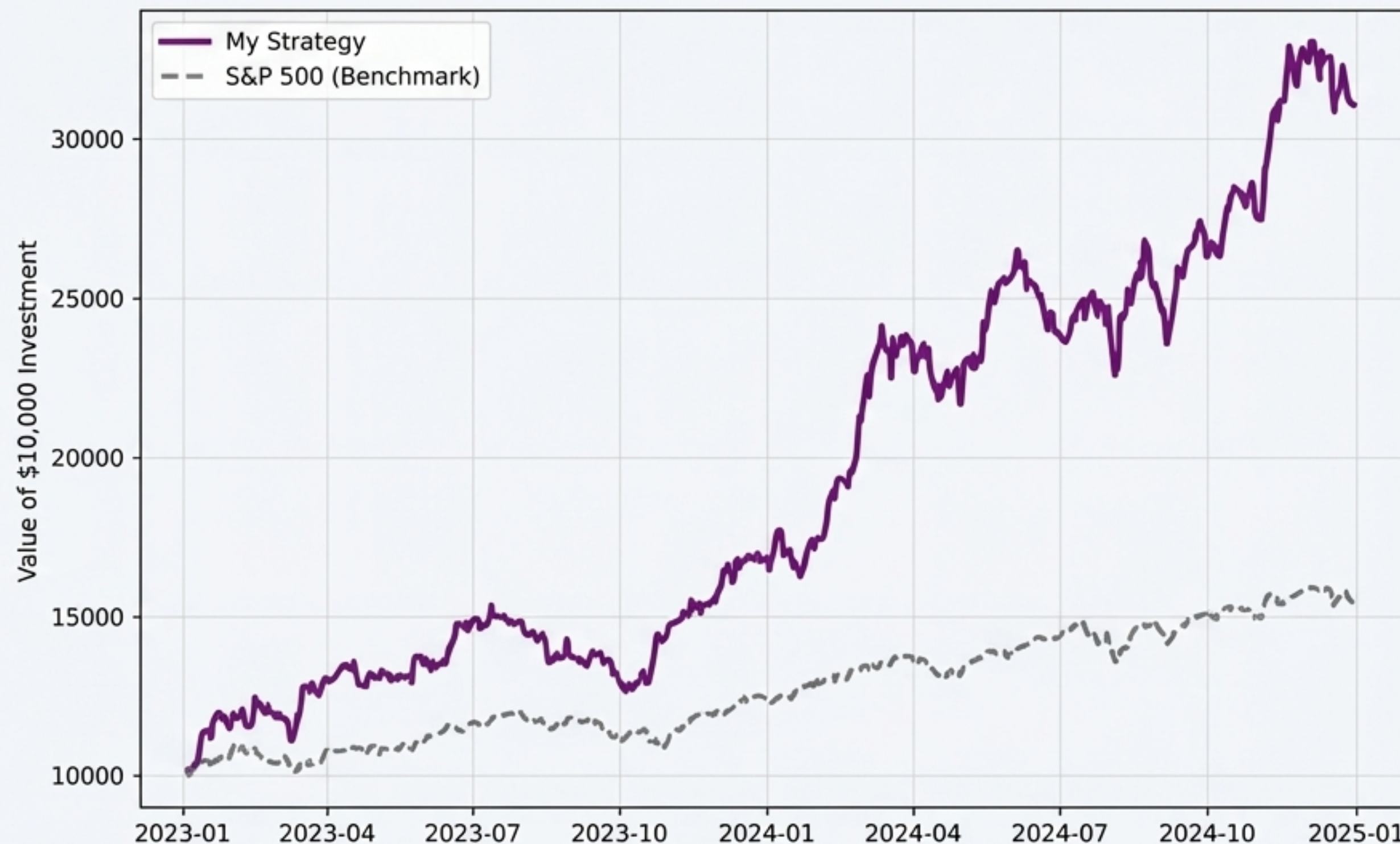
\$39,985.27

Final Value of \$10,000

1.95

Sharpe Ratio

A measure of risk-adjusted return. Values above 1.0 are generally considered good.



Statistical Arbitrage finds mathematically-linked assets and trades their temporary deviations.

Concept

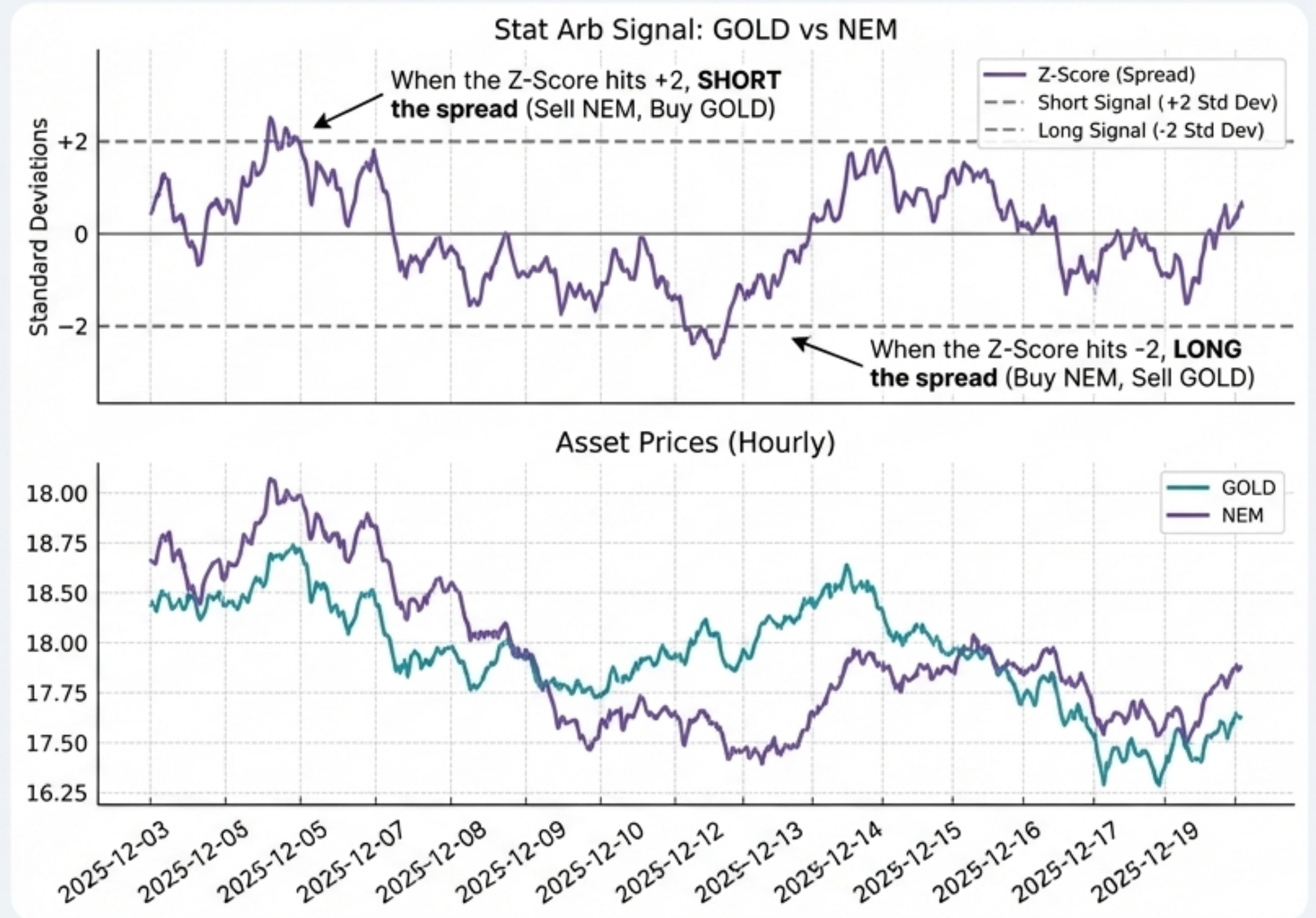
The strategy relies on **cointegration**: a statistical property of two assets that are bound together over the long term. When their price relationship temporarily breaks, we trade in anticipation of it reverting to the mean.

Example

Gold Miners - **GOLD (Barrick Gold)** vs. **NEM (Newmont Corporation)**

Test Result

An Engle-Granger test confirms cointegration with a **p-value of 0.0953** (below our 0.10 threshold).

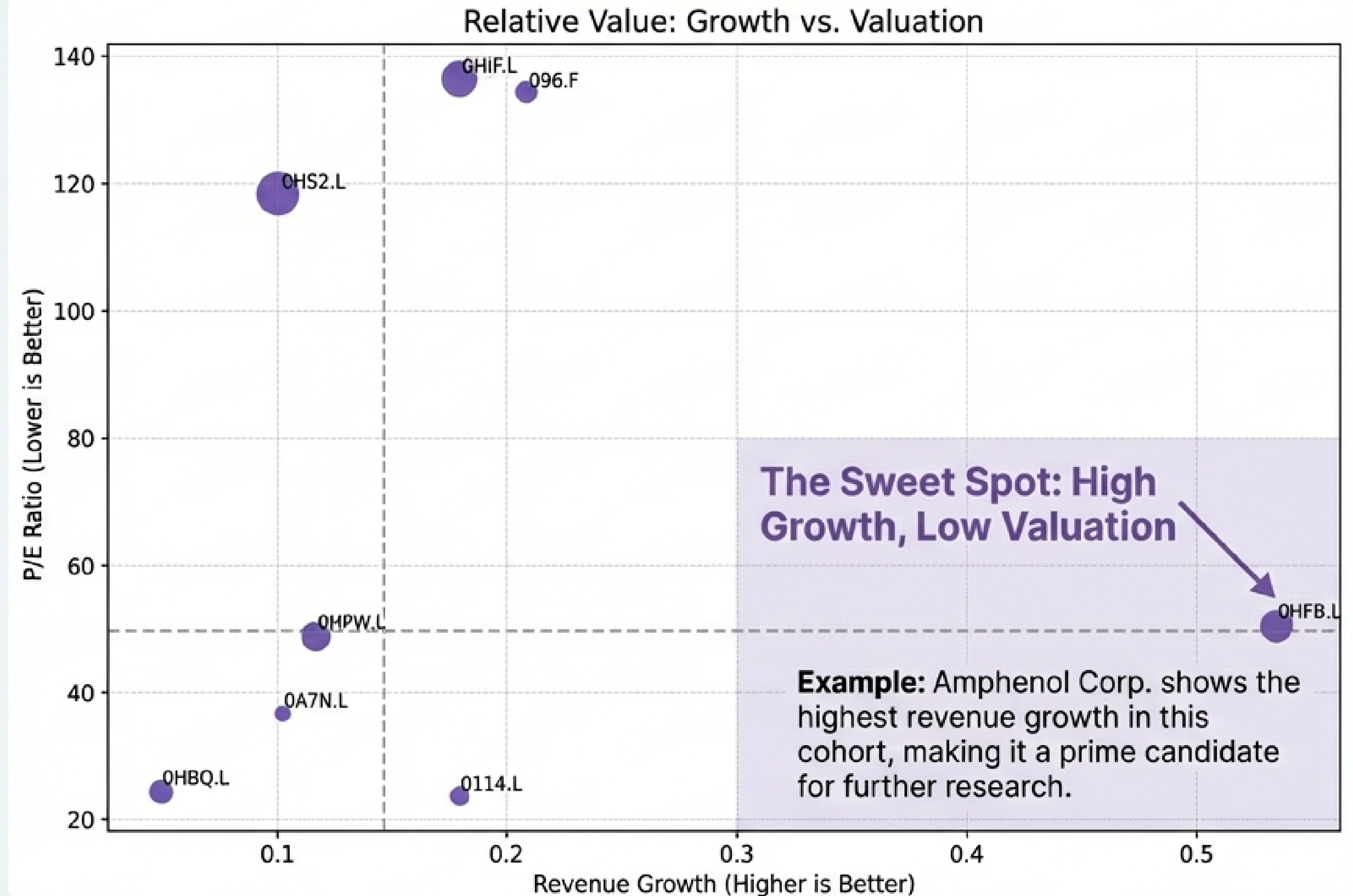


Relative value screening systematically uncovers stocks with high growth potential at a reasonable price.

Methodology

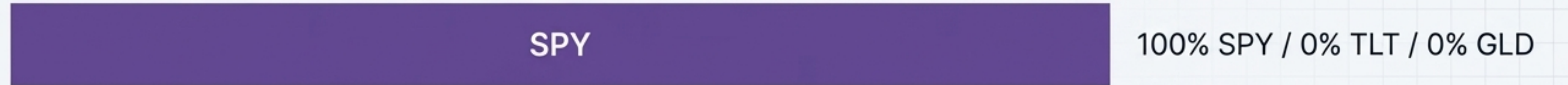
We scan a universe of 15 US Large Cap Tech stocks and plot them based on two key metrics:

- **Revenue Growth** (Higher is better)
- **P/E Ratio** (Lower is better)

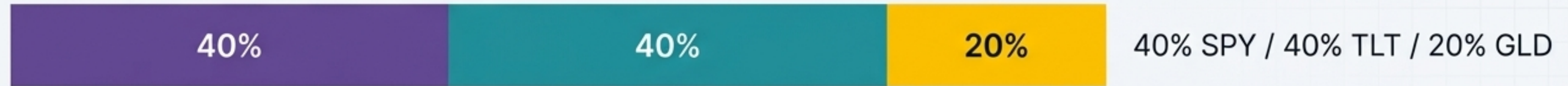


The AI executes a clear playbook, shifting allocations for each detected regime.

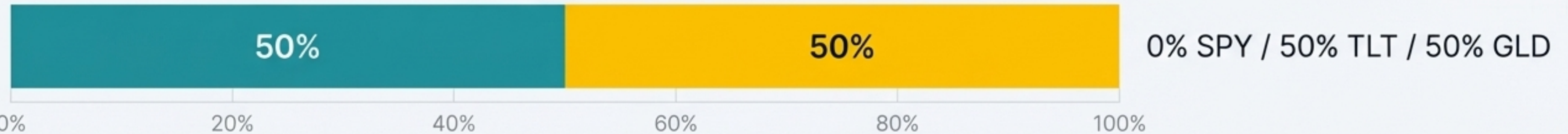
Bull Market (Regime 0) - Aggressive Growth



Transition (Regime 1) - Balanced / Neutral

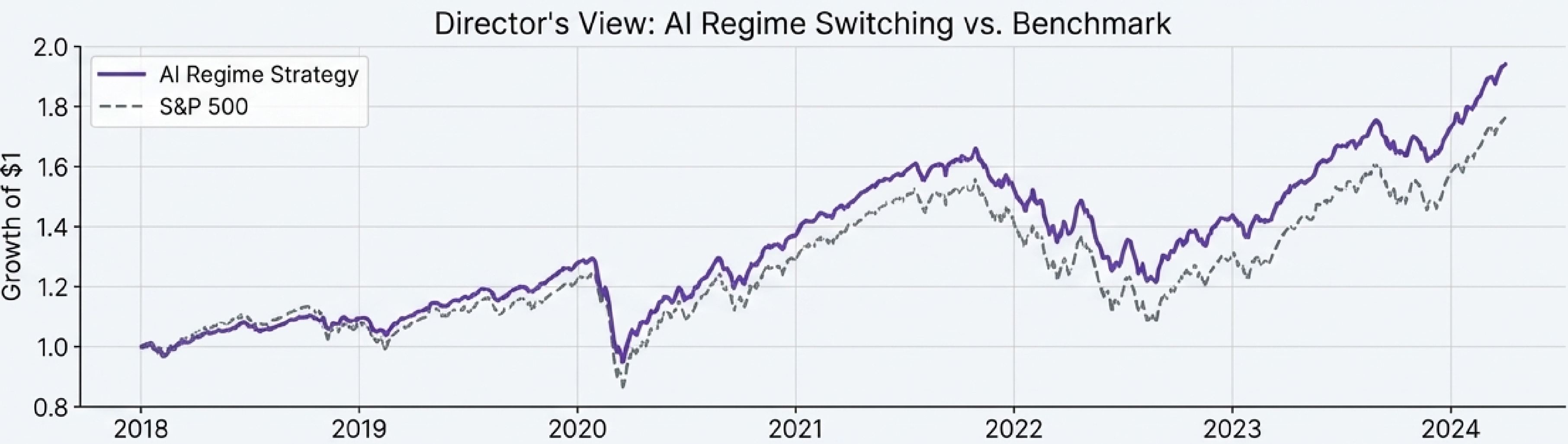


Crisis (Regime 2) - Defensive / Risk-Off



Key Insight: This is a true tactical asset allocation model. It is fully long equities in calm markets but shifts entirely to defensive bonds and gold during crises.

Over a six-year backtest, the AI-driven strategy successfully navigated multiple market cycles.



The AI strategy's overall growth tracks the S&P 500 closely from 2018 to 2024.



It demonstrates resilience, particularly during the sharp downturns of early 2020 and the 2022 bear market.



While not generating significant alpha in this period, its performance profile is fundamentally different from a simple 'buy and hold' approach. The true value is in its dynamic risk management.

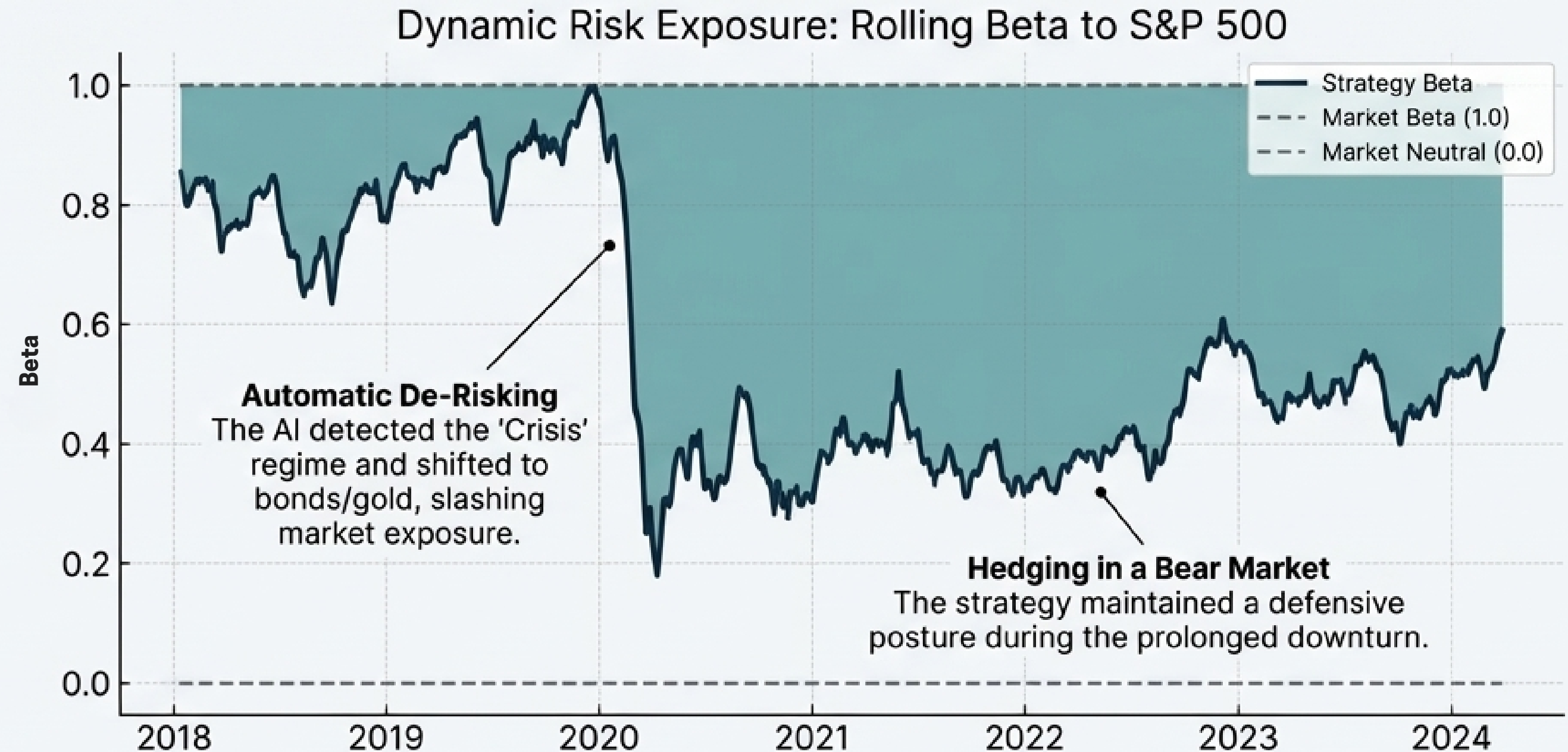
The system's intelligence is proven by its ability to automatically reduce risk when it matters most.

Concept

We measure the strategy's sensitivity to the market using Beta.

A Beta of 1.0 means moving in lockstep with the S&P 500.

A Beta of 0.0 is market-neutral.



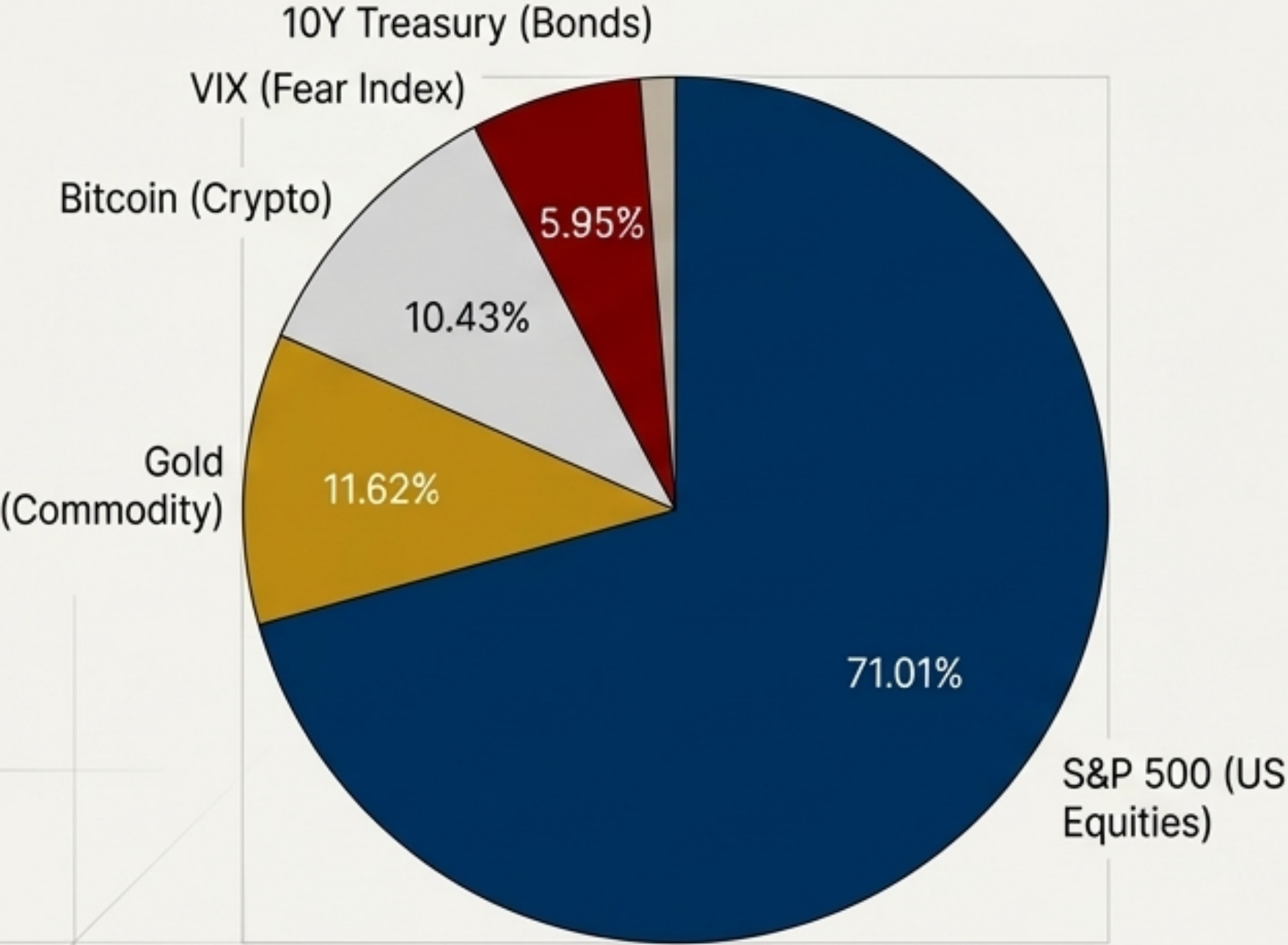
Key Takeaway

Unlike a static portfolio, this system actively hedges, proving it can adapt its risk profile to the prevailing market environment.

The AI's Recommended Portfolio Allocation

Based on the 10-day forecast, the optimizer produced the following allocation:

AI-Optimized Portfolio Allocation



Portfolio Weights

Asset	Weight
S&P 500 (US Equities)	71.01%
Gold (Commodity)	11.62%
Bitcoin (Crypto)	10.43%
VIX (Fear Index)	5.95%
10Y Treasury (Bonds)	1.00%
Other Assets	0.00%

Key Insight: The AI loaded up on "S&P 500 (US Equities)" because it predicts an annualized return of **12.93%** for the next 10 days.