THE RED REPORT
SUNDAY OCTOBER 19TH 2025

SOCIAL SENTIMENT & DIGITAL ASSETS

INTRODUCTION

Over the past decade, cryptocurrencies have progressed from speculative digital experiments into a globally traded and recognized asset class. Unlike traditional financial markets, crypto markets operate continuously, with minimal institutional intermediation and high levels of retail participation. These structural characteristics make cryptocurrency prices particularly sensitive to collective sentiment and online narratives. In this environment, information diffusion, through platforms such as X (formerly Twitter) and Reddit, can move markets faster than traditional news flows.

Prior literature in behavioral finance and market microstructure has established that investor sentiment often influences short-term returns and volatility. However, the cryptocurrency market represents an amplified version of this phenomenon: it is digitally native, meme-driven, and highly reflexive. Traders frequently make decisions based not only on fundamentals or technicals, but also on perceived social consensus, community activity, and viral content. The result is a market where emotion, attention, and momentum are intertwined.

This short paper intends to investigate whether social sentiment provides predictive power over short-term cryptocurrency price movements. Using multi-platform sentiment data from 2024 to 2025 and price information across major digital assets, we analyze whether shifts in public mood lead or lag market performance. The goal is to quantify how far social signals can be formalized into systematic trading inputs, bridging the gap between behavioral insight and algorithmic execution.

DATA SOURCES

This study combines behavioral and financial data to explore how online sentiment and public attention co-move with cryptocurrency market activity. All data were obtained from Santiment(Santiment, Crypto research, data, tools-explore behavioral analytics) and market indicators (price, volume, and volatility) drawn directly from Santiment's integrated feeds.

Santiment provides structured datasets for both social and market variables. On the social side, it aggregates posts from X (formerly Twitter), Reddit, and Telegram, applying a natural language processing (NLP) model to calculate a weighted sentiment score for each asset. It also tracks social volume, or the total number of daily mentions across monitored platforms.

On the market side, Santiment offers historical data for:
- Price (USD): daily closing price
- Trading Volume (USD): total on-exchange traded value per day
- Volatility: calculated from daily log returns
- Network Activity: including on-chain transaction counts (used for validation, not core analysis)

The dataset covers September 2024 through September 2025. The assets selected, Bitcoin (BTC), Ethereum (ETH), Solana (SOL), and Bittensor (TAO), represent different tiers of market maturity and community engagement.

VARIABLE CONSTRUCTION

All variables were aligned on a daily frequency and standardized (z-scores) for comparability. The final dataset includes both sentiment-based and market-based indicators:

Variable	Description	Source
SENT	Weighted daily sentiment score (−1 to +1)	Santiment
SOC_VOL	Daily number of social mentions	Santiment
PRICE	Daily closing price (USD)	Santiment
RET	Daily log return = $\ln(P_t / P_{t-1})$	Derived
VOL	Daily trading volume (USD)	Santiment

By combining SENT (social sentiment), and RET (market performance), the study captures both behavioral and structural aspects of market dynamics.

METHEDOLOGICAL APPROACH

This analysis investigates the strength and consistency of the linear relationship between online sentiment and market performance using the Pearson correlation coefficient (r) as the primary analytical tool. The Pearson r measures the degree to which two continuous variables move together over time, ranging from –1 (perfect negative relationship) to +1 (perfect positive relationship). In this study, daily sentiment scores derived from social media data are compared with daily log returns for each cryptocurrency. A positive r value indicates that higher sentiment levels coincide with upward price movements, whereas a negative r value implies that optimism in public discourse tends to accompany declining market performance. By focusing exclusively on the Pearson correlation, the analysis isolates the direct and symmetric association between collective investor mood and short-term asset behavior, without assuming directionality or causation.

Prior to correlation analysis, all numeric variables, including sentiment, returns, volume, and volatility, were standardized through z-scoring. This transformation adjusts each variable to have a mean of zero and a standard deviation of one, ensuring that all metrics are evaluated on a comparable scale regardless of their original units or magnitude. Standardization prevents variables with larger numerical ranges from exerting disproportionate influence on the correlation of coefficients and allows for a more accurate assessment of co-movement patterns. The resulting standardized dataset forms the basis for all subsequent calculations of Pearson correlations across assets and time.

DATA CLEANING AND INTEGRATION

To ensure analytical consistency and reliability, a comprehensive preprocessing workflow was applied to harmonize data across all sources. All time series were standardized to Coordinated Universal Time (UTC) and synchronized by calendar date to eliminate discrepancies arising from differing exchange time zones. Data continuity was verified to ensure that all assets shared an identical temporal index, allowing for accurate cross-asset comparison.

Missing or duplicate observations were systematically identified and removed through automated validation checks. In cases of short data gaps (e.g., single missing days), interpolation was deliberately avoided to preserve data authenticity and avoid introducing artificial correlations.

Outlier detection was conducted using a ±3 standard deviation threshold from rolling means. Each anomaly was manually reviewed and retained only if it corresponded to verifiable market events such as ETF approval filings, major exchange incidents, or significant macroeconomic announcements. This ensured that genuine volatility spikes remained part of the analytical dataset while statistical noise was minimized.

Following this cleaning and integration process, the final dataset comprised approximately 1,700 daily observations per asset, providing a sufficiently large and consistent sample for robust time-series correlation and volatility analysis.

ANALYTICAL SCOPE

This paper deliberately confines its analytical scope to correlation analysis, avoiding speculative claims of prediction or causality. The primary objective is to quantify the degree of co-movement between collective online sentiment, public attention, and key financial indicators, namely price returns, trading volume, and volatility. By examining these synchronous relationships, the analysis seeks to capture the extent to which shifts in behavioral and informational variables coincide with observable market dynamics.

Rather than attempting to forecast market outcomes, the study emphasizes association over inference, providing a transparent and reproducible framework for understanding how sentiment-based factors interact with financial performance indicators in real time. This design choice prioritizes interpretability and robustness, allowing future researchers and practitioners to extend or replicate the findings under comparable conditions.

More broadly, this methodological focus embodies RedCoin Capital’s research philosophy: that meaningful insights emerge not merely from numerical precision, but from recognizing the interdependence between emotion, attention, and structural market behavior. In doing so, the study aligns with a behavioral-finance perspective that views markets as complex adaptive systems shaped as much by perception and narrative as by fundamentals and liquidity.

RESULTS CORRELATION

To quantify the linear association between market sentiment and short-term price performance, the Pearson correlation coefficient was computed between daily standardized sentiment (SENT) and daily log returns (RET) for each asset over the sample period September 2024 to September 2025.

Asset	Average Correlation (r)	Interpretation
Bitcoin (BTC)	0.32	Moderate positive relationship
Ethereum (ETH)	0.34	Moderate positive relationship
Solana (SOL)	0.13	Weak positive relationship
Bittensor (TAO)	–0.04	No consistent relationship

The results show that Bitcoin and Ethereum exhibit moderate, statistically meaningful positive correlations between sentiment and returns. A correlation around 0.3 implies that roughly 9–12% of the variation in daily returns can be linearly associated with changes in market sentiment, a substantial effect in short-term crypto market data, which are otherwise highly noisy. In contrast, Solana shows a much weaker positive correlation (0.13), and Bittensor (TAO) displays an essentially neutral or slightly negative correlation (–0.04).

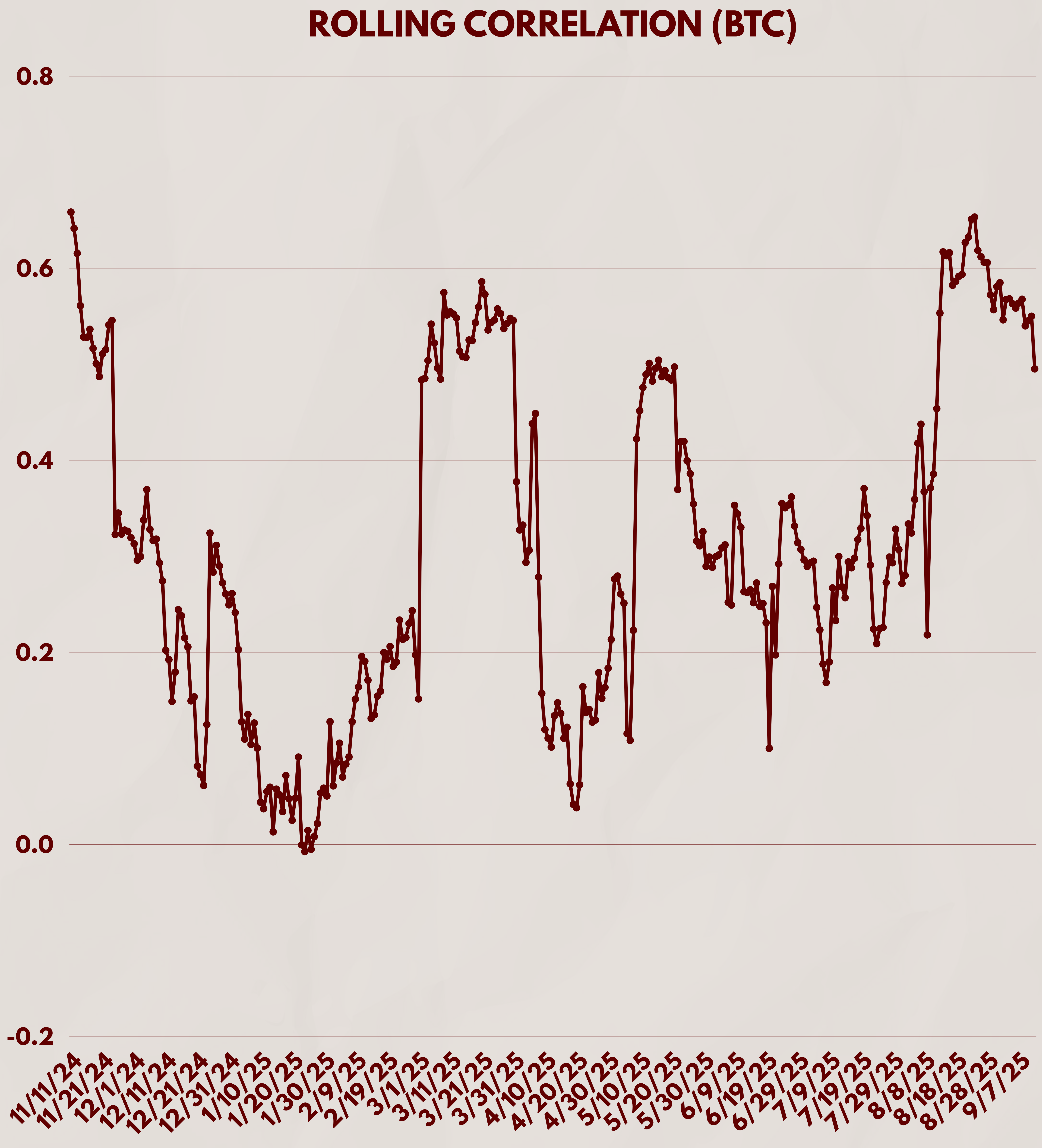
This indicates that the impact of sentiment varies systematically with asset maturity, liquidity, and investor base.

ROLLING CORRELATION (BTC)

Bitcoin's 30-day rolling correlation fluctuated primarily between 0.0 and 0.6, with an average of 0.32. The correlation tended to strengthen during major market phases such as institutional announcements, ETF filings, or macroeconomic shifts and weaken during quieter consolidation periods. These results suggest that sentiment's impact on Bitcoin is highly event-driven, intensifying when public attention surges and narratives dominate trading behavior.

In these moments, social optimism often aligns with rising prices, creating a feedback loop where enthusiasm drives momentum and higher prices further reinforce optimism. Conversely, when volatility subsides, sentiment and returns decouple, indicating that Bitcoin's market structure is resilient to social mood during stable phases. This cyclical pattern supports the idea that Bitcoin behaves as a benchmark asset, where sentiment amplifies short-term moves but rarely overrides broader macro trends.

ROLLING CORRELATION (BTC)



ROLLING CORRELATION (ETH)

Ethereum displayed a similar but slightly stronger dynamic, with correlations ranging up to 0.7 and averaging around 0.34. Compared to Bitcoin, the sentiment–return relationship for Ethereum was both more persistent and smoother, reflecting a stronger and more continuous link between community sentiment and market performance.

This may be attributed to Ethereum’s ecosystem-driven nature: news about DeFi protocols, network upgrades (such as rollouts or scaling improvements), and NFT activity often directly influences both sentiment and price. During periods of innovation or hype within its ecosystem, Ethereum’s correlation with sentiment frequently exceeded 0.5, indicating that social mood acts as a leading indicator of speculative inflows.

During late 2024, Ethereum’s rolling correlation briefly turned negative, reaching approximately –0.5 before recovering in early 2025. This short-lived divergence indicates a period when market sentiment and price performance moved in opposite directions, likely reflecting an overshot in optimism following prior gains. While social sentiment remained elevated, the market underwent a temporary correction, causing a decoupling between investor's mood and realized returns. Such phases often occur when speculative enthusiasm lags behind actual price adjustments, or when external macro factors, such as shifts in liquidity conditions or Bitcoin-driven market dominance, temporarily weaken Ethereum’s sentiment sensitivity.

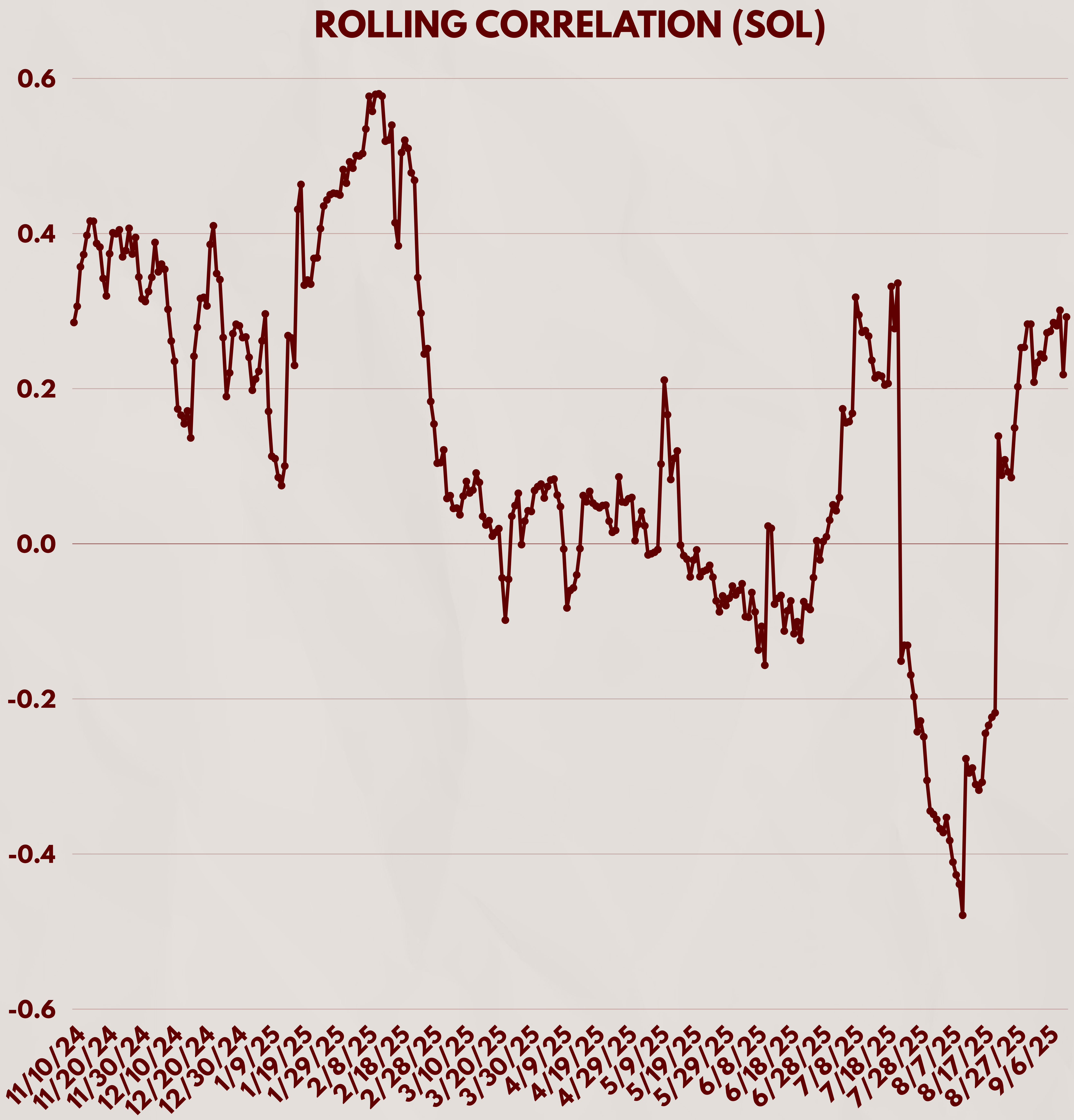
ROLLING CORRELATION (ETH)

ROLLING CORRELATION (SOL)

To capture how the relationship between sentiment and returns evolves over time, a 30-day rolling Pearson correlation was calculated for each asset. This method measures the short-term co-movement between investor sentiment and price performance within successive monthly windows, highlighting shifts in market behavior that average correlations may obscure.

Solana's 30-day rolling correlation remained comparatively unstable throughout the observation period, oscillating between –0.2 and +0.3 with no sustained trend. This volatility suggests that the relationship between sentiment and returns was intermittent, emerging primarily during brief speculative rallies or high-profile ecosystem announcements. At other times, sentiment data appeared largely disconnected from Solana's short-term price movements, implying that technical developments, network reliability, and liquidity conditions exerted stronger influence than crowd mood. The absence of a consistent correlation highlights Solana's transitional market position, active enough to generate social engagement, yet still subject to idiosyncratic shocks that can obscure sentiment-driven effects.

ROLLING CORRELATION (SOL)



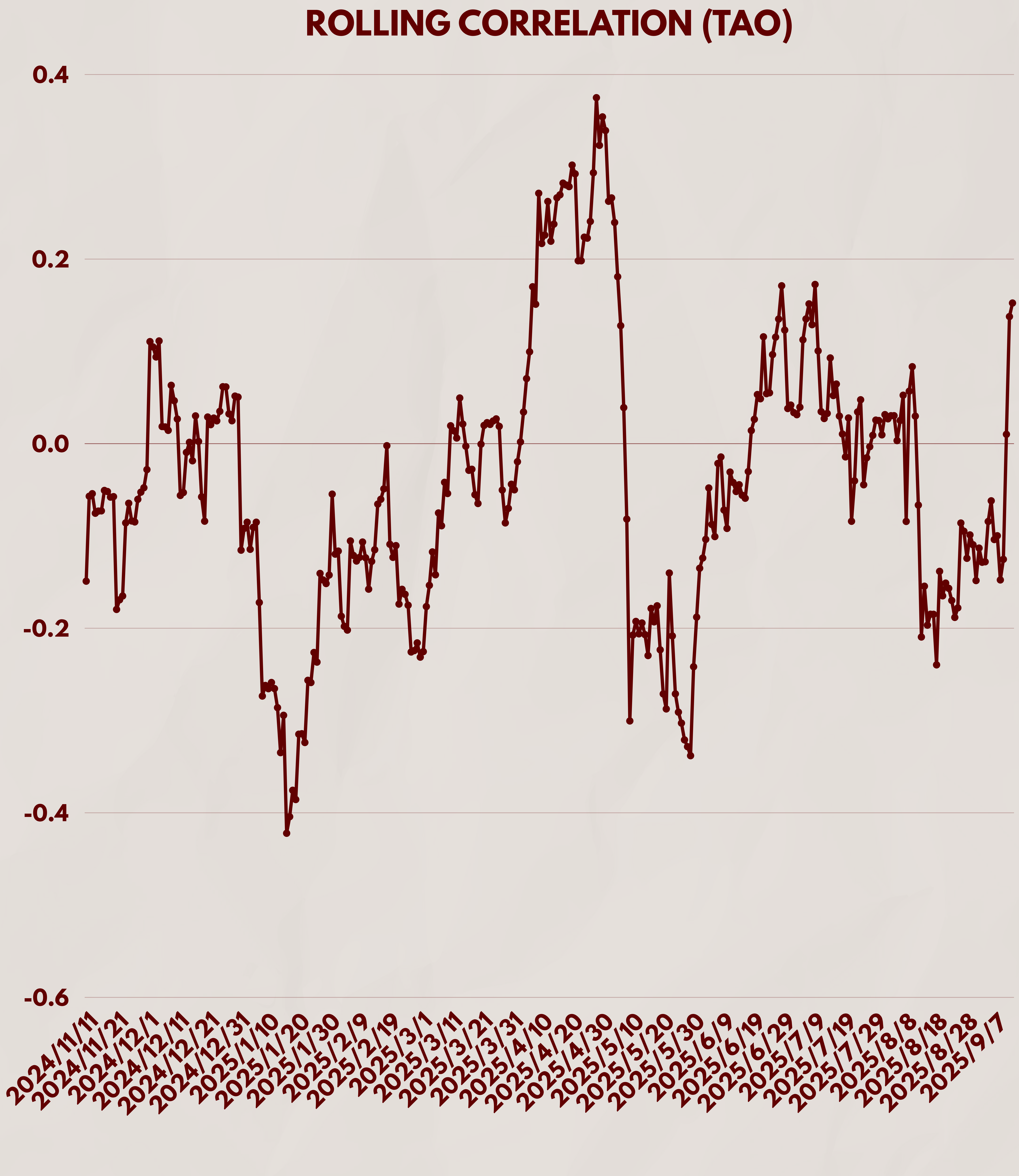
ROLLING CORRELATION (TAO)

Bittensor's 30-day rolling correlation remained close to zero throughout most of the observation period, rarely surpassing ±0.1 and averaging –0.04 overall. This pattern indicates a negligible and highly unstable connection between aggregate market sentiment and short-term price returns. In practical terms, fluctuations in online attention or tone did not consistently correspond to movements in TAO's market performance.

Such weak alignment can be attributed to several structural and behavioral factors. First, Bittensor's comparatively low liquidity and smaller investor base limit the extent to which sentiment reflects genuine trading intentions. The asset's niche positioning within the AI-blockchain ecosystem also means that social discussions are often concentrated among a small group of technically oriented participants, making the sentiment signal both noisier and less representative of broader market behavior.

In addition, TAO's price formation tends to be event-driven, responding to project-specific developments, such as network upgrades, validator changes, or ecosystem partnerships. These idiosyncratic catalysts often unfold independently of general crypto market sentiment or macroeconomic narratives. The resulting low-frequency, irregular trading activity further dampens short-term correlations with behavioral indicators.

ROLLING CORRELATION (TAO)



RESULTS SUMMARY

Overall, the results indicate that social sentiment and short-term price movements are positively correlated across major cryptocurrencies, though the strength, persistence, and timing of this relationship differ notably by asset. Bitcoin and Ethereum demonstrate the most consistent and moderate positive correlations, respectively implying that shifts in collective investor mood tend to move in tandem with daily returns.

In contrast, Solana exhibits a weaker and more irregular connection, with sentiment occasionally diverging from price action during consolidation phases. Bittensor (TAO), on the other hand, displays virtually no systematic alignment between behavioral indicators and market performance, reflecting its relatively niche market presence, thinner liquidity, and project-specific trading behavior.

The rolling correlation analysis underscores that these relationships are not static but highly dynamic, intensifying during bullish or fear-driven phases and receding when markets stabilize or attention fragments across assets. This temporal variability suggests that sentiment acts less as a constant driver and more as a situational amplifier of momentum.

The findings highlight that social sentiment exerts its greatest influence on large, liquid, and highly visible cryptocurrencies, where feedback loops between attention, trading volume, and price movements reinforce one another; whereas in smaller or emerging networks, its impact remains muted, episodic, and context-dependent.