

# Navigating Market Sentiment During the Bitcoin ETF Approval Process

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The journey towards the approval of Bitcoin ETFs has been a pivotal saga in the cryptocurrency domain, marked by intense speculation, anticipation, and a profound impact on market dynamics. This article delves into the nuanced shifts in market behavior with a focus on the metrics from option markets, as they are pivotal indicators for the sentiment for Ethereum (ETH) and Bitcoin (BTC). The analysis reveals that the relative expensiveness of out-of-the-money (OTM) options has orthogonal features, offering unique insights not captured by traditional metrics.

## Understanding the Volatility Tail Index (VTI)

Central to our analysis is the Volatility Tail Index (VTI), a nuanced metric that captures the market's relative perception of extreme events, or “tail risk/expensiveness”, in cryptocurrency markets. The VTI is calculated as follows:

$$VTI = 100 \times \frac{\text{Volmex Implied Volatility} - \text{ATM BS Implied Volatility}}{\text{ATM BS Implied Volatility}}$$

For Ethereum and Bitcoin, the implied volatilities are represented by EVIV and BVIV, respectively. These indexes reflect the market's consensus on the expected volatility over the next 30 days, derived from the options model-free. The Black-Scholes Implied Volatility (BSIV), on the other hand, is obtained from the Black-Scholes model, which provides a theoretical estimate of volatility based on at-the-money options with a 30-day expiry.

## Pre-ETF Hype: Setting the Stage

In the lead-up to the ETF approval process, the market was rife with speculation and uncertainty. The “Pre-ETF Hype” period, which we define as the time window from the beginning of October 2022 to the end of August 2023, was marked by a complex interplay of market forces, including significant adverse shocks such as the FTX crash. Despite these challenges, the cryptocurrency market demonstrated remarkable resilience, embarking on an upward trajectory since January 2023, as can be seen in Figures 1a and 1b below.

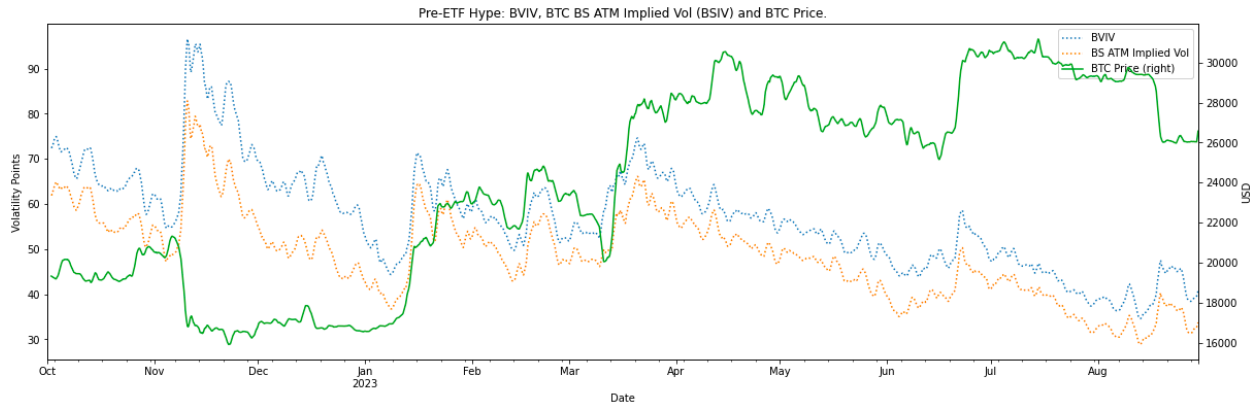


Figure 1a: BVIV, BTC BS ATM Implied Volatility (BSIV) and BTC Price during Pre-ETF Hype period

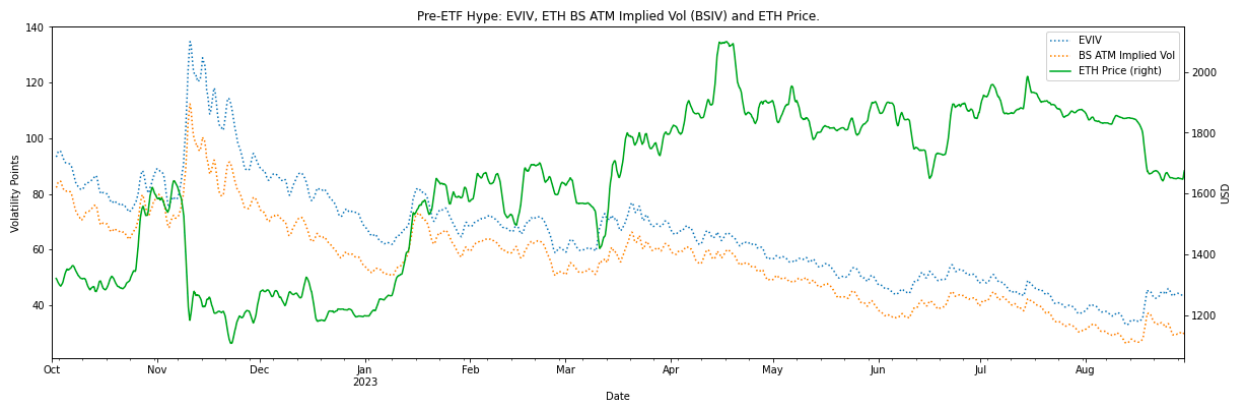


Figure 1b: EVIV, ETH BS ATM Implied Volatility (BSIV) and ETH Price during Pre-ETF Hype period

This period of recovery and growth was characterized by a notable decrease in implied volatilities which were negatively correlated with underlying asset prices (-73.45% for ETH, -58.44% for BTC), reflecting a gradual stabilization and growing investor confidence in the market.

During this period, the behavior of the tail expensiveness (i.e., VTI) offered unique insights. While the overall implied volatility levels decreased, the VTI captured the underlying market moves, reflecting the relative differences. VTI was fluctuating with spikes, as can be seen in Figures 2a and 2b below, when markets see large negative returns, which gives negative correlation with price levels, -22.42% for ETH, -48.08% for BTC.

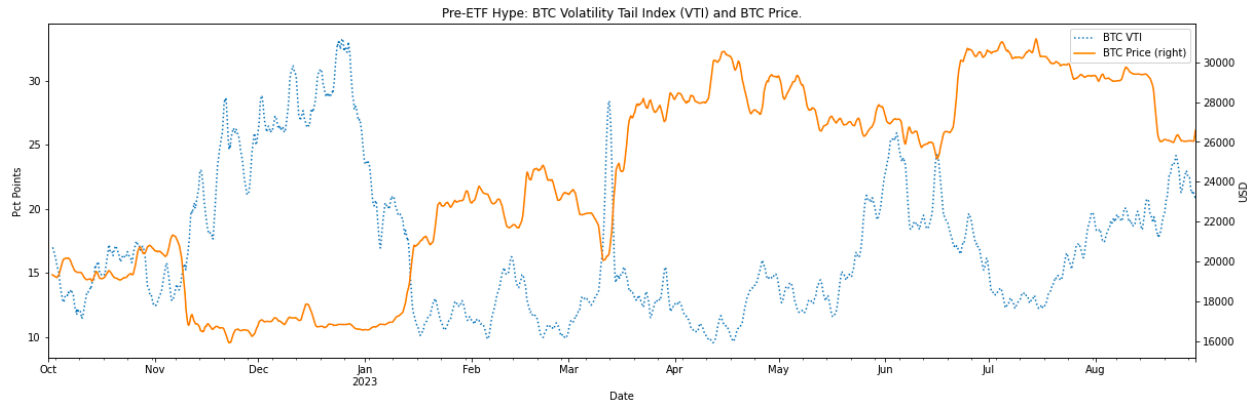


Figure 2a: BTC Volatility Tail Index (VTI) and BTC Price during Pre-ETF Hype period

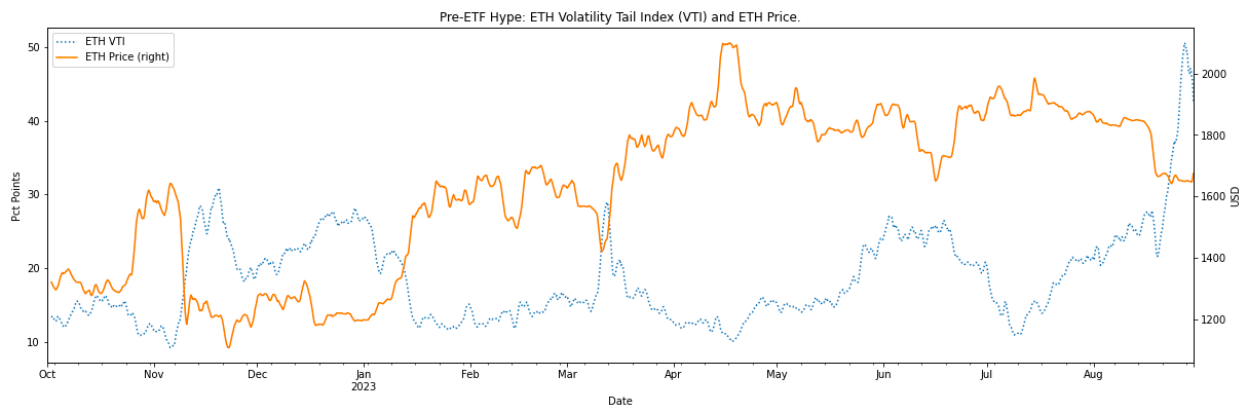


Figure 2b: ETH Volatility Tail Index (VTI) and ETH Price during Pre-ETF Hype period

Interestingly, both ETH and BTC skews<sup>1</sup> remained positive, reflecting relatively expensive put options, a bearish sentiment, and the correlations between VTI and skew were significantly positive (54.73% for ETH, 65.53% for BTC) as seen in Figures 3a and 3b below.

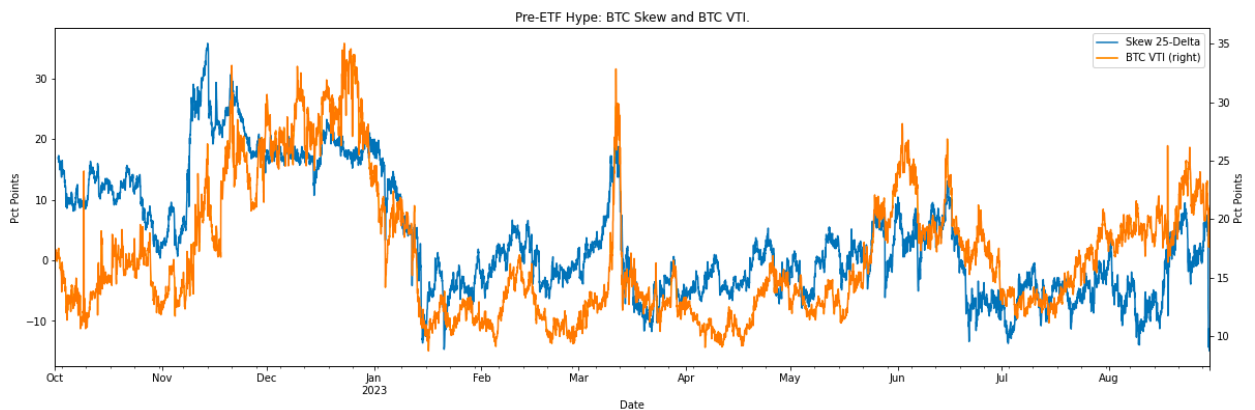


Figure 3a: BTC Skew and BTC Volatility Tail Index (VTI) during Pre-ETF Hype period

<sup>1</sup> We define Skew as 25-Delta Put Black-Scholes implied vol minus 25-Delta Call Black-Scholes implied vol divided by ATM Black-Scholes implied vol (i.e., BSIV)

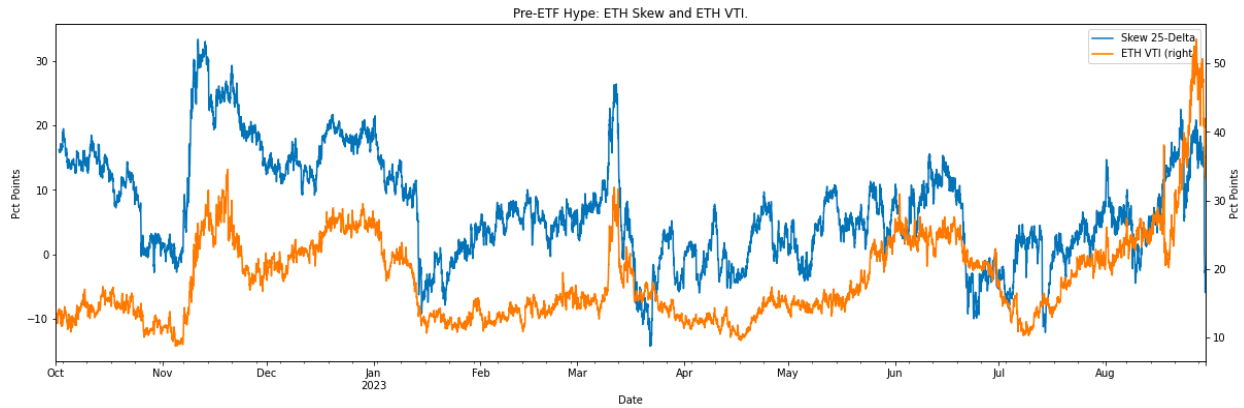


Figure 3b: ETH Skew and ETH Volatility Tail Index (VTI) during Pre-ETF Hype period

## The ETF Hype: A Tumultuous Transition

The “ETF Hype” period, extending from the end of August 2023 to January 10, 2024, was a time of significant market activity and sentiment shifts, driven by speculative trading and anticipation of regulatory decisions regarding Bitcoin ETFs.

This period was characterized by heightened market activity, with investors and traders closely monitoring regulatory developments and their potential impact on the cryptocurrency market. The anticipation of ETF approvals contributed to increased trading volumes and speculative trading, influencing the pricing and volatility of options. Markets exhibited a significant shift in the relationship between implied volatilities and asset prices for both Ethereum (ETH) and Bitcoin (BTC) as in Figures 4a and 4b below.

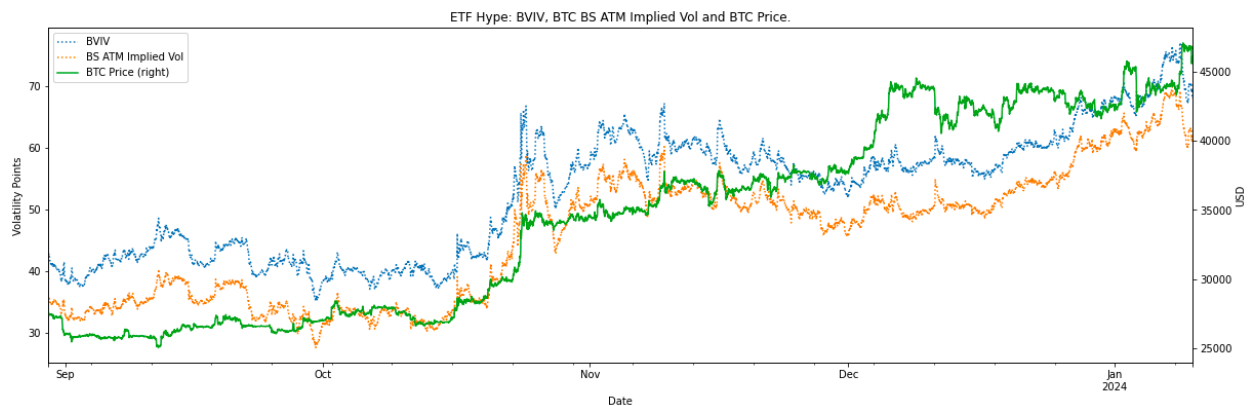


Figure 4a: BVIV, BTC BS ATM Implied Volatility (BSIV) and BTC Price during ETF Hype period

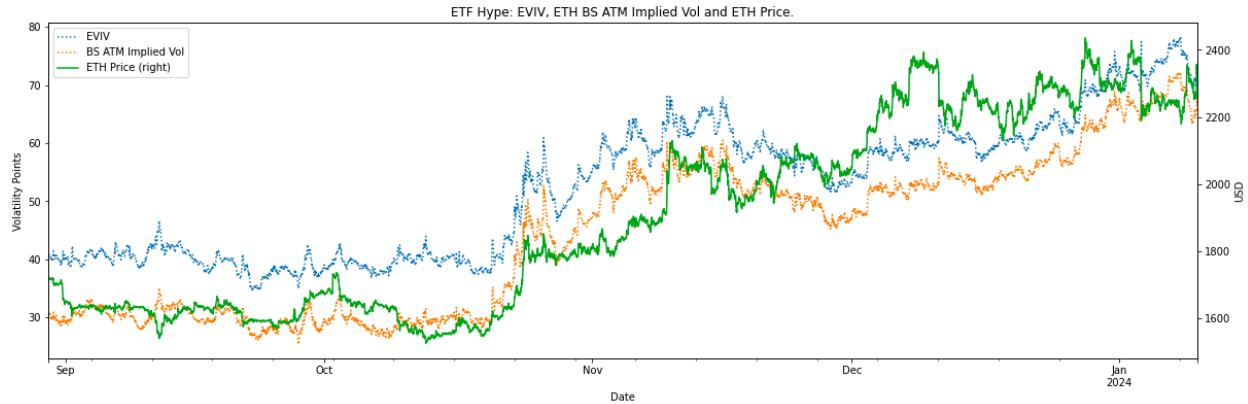


Figure 4b: EVIV, ETH BS ATM Implied Volatility (BSIV) and ETH Price during ETF Hype period

Contrary to the Pre-ETF Hype phase, where correlations between implied volatilities and prices were notably negative, this period saw very high positive correlations: 90.24% for ETH and 88.95% for BTC. This change underscores a remarkable transformation in market dynamics and investor sentiment, highlighting several key aspects:

1. **Alignment of Volatility and Price Movements:** The high positive correlations indicate that as the prices of ETH and BTC increased, so did their implied volatilities. This suggests that the upward price movements were accompanied by heightened market expectations of future volatility, possibly driven by speculative trading and the influx of new or less risk-averse investors into the market.
2. **Speculative Optimism:** The positive correlation could reflect a speculative optimism among investors, where rising prices fueled expectations of continued upward momentum, leading to increased demand for options and, consequently, higher implied volatilities. This optimism may have been partly spurred by the anticipation of ETF approvals, seen as a bullish development for the cryptocurrency sector.
3. **Market Sentiment Shift:** The transition from negative to positive correlations between implied volatilities and prices marks a significant shift in market sentiment. During the "Pre-ETF Hype" period, higher volatility was perhaps perceived as a sign of risk or uncertainty, leading to price declines. However, during the "ETF Hype" period, increased volatility became associated with potential for higher returns, contributing to price increases.
4. **Regulatory Anticipation:** The impending decision on Bitcoin ETFs likely played a central role in shaping investor behavior during this period. The prospect of regulatory approval may have contributed to heightened market activity and volatility, as investors adjusted their positions in anticipation of the potential impact of ETFs on the cryptocurrency market.

- Liquidity and Market Dynamics:** The positive correlation also suggests changes in market liquidity and dynamics, with increased trading activity potentially leading to more significant price swings. As investors positioned themselves for the anticipated ETF approvals, the market may have experienced increased liquidity, contributing to the alignment of price and volatility movements.

In the ETF Hype period, the cryptocurrency market experienced significant changes in sentiment towards tail events as well, as reflected in Figures 5a and 5b below.

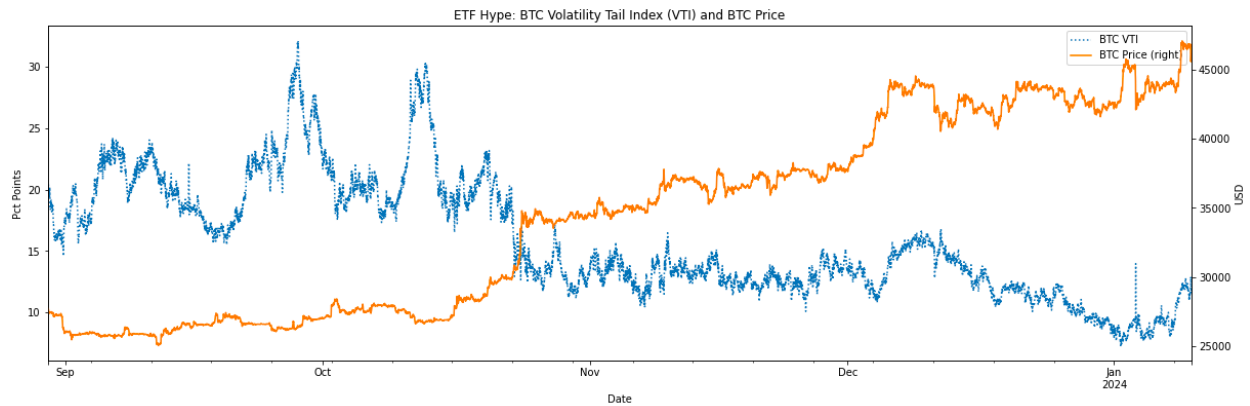


Figure 5a: BTC Volatility Tail Index (VTI) and BTC Price during ETF Hype period

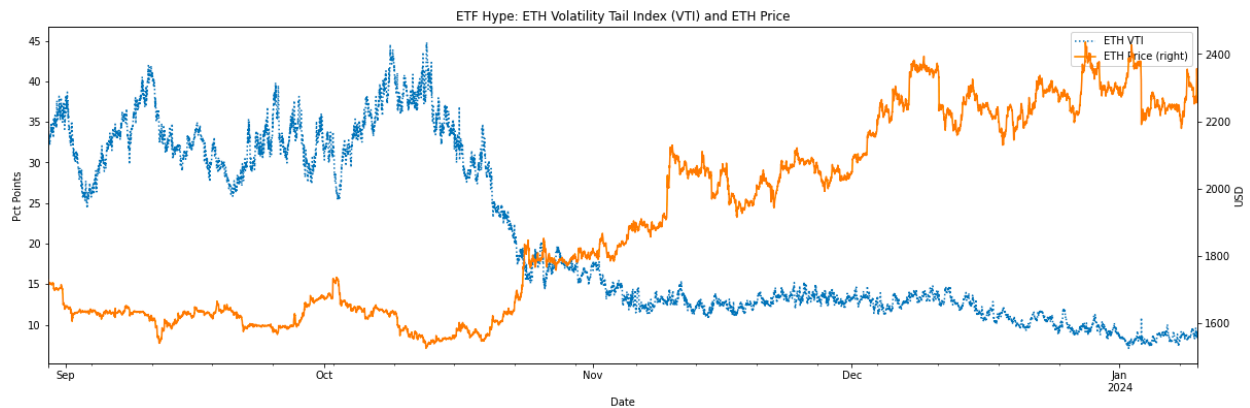


Figure 5b: ETH Volatility Tail Index (VTI) and ETH Price during ETF Hype period

The Volatility Tail Index (VTI), which captures the market's perception of tail risk or the expensiveness of OTM options, indicated a notable shift in how investors assessed the likelihood and impact of extreme market movements.

- Decrease in VTI as Prices Rose:** As the prices of Ethereum (ETH) and Bitcoin (BTC) increased, the VTI for both cryptocurrencies decreased. This inverse relationship suggests that as the market became more bullish and prices climbed, investors' concerns about

extreme downside risk diminished. The decrease in VTI implies a flattening of the volatility smile, indicating that out-of-the-money (OTM) options, both puts and calls, became relatively less expensive in terms of implied volatility.

2. **High Negative Correlation between VTI and Price:** The period was marked by a very high negative correlation between VTI and cryptocurrency prices: -88.28% for ETH and -82.65% for BTC. This strong inverse relationship underscores how rising prices were accompanied by a reduction in market concerns about tail risks. As prices went up, the market consensus shifted towards a lower probability or perceived impact of extreme price movements, leading to a decrease in the relative cost of insuring against such events through OTM options.
3. **Flattening of the Volatility Smile:** The observed decrease in VTI indicates a significant flattening of the volatility smile during this period. A flattened volatility smile suggests that the market's implied volatility became more uniform across different strike prices, reflecting a more balanced or muted expectation of extreme price movements in either direction.
4. **Changing Market Sentiment and Dynamics:** The changes in VTI and its relationship with prices reflect a broader shift in market sentiment and dynamics during this period. The anticipation of ETF approvals contributed to increased bullish sentiment, driving prices higher while simultaneously reducing the market's focus on tail risks. This period of high optimism and speculative trading led to a reassessment of the likelihood and potential impact of extreme market events.
5. **Implications for Investors and Risk Management:** The behavior of VTI during this period has important implications for investors and risk management strategies. The reduction in perceived tail risk, as indicated by the decrease in VTI, suggests that investors may have been less inclined to pay a premium for protection against extreme downside events. However, this also highlights the importance of monitoring changes in tail risk perceptions, as they can provide valuable insights into market sentiment and potential shifts in risk appetite.

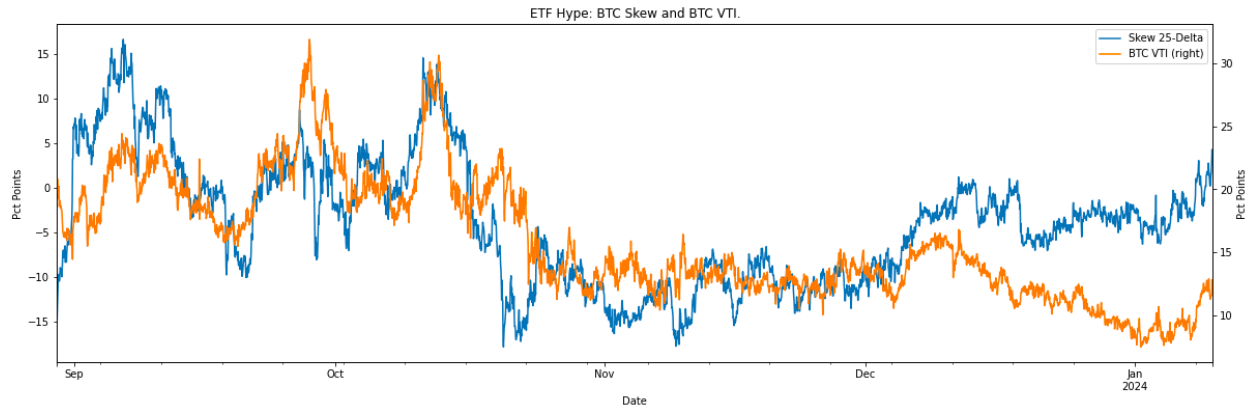


Figure 6a: BTC Skew and BTC Volatility Tail Index (VTI) during ETF Hype period

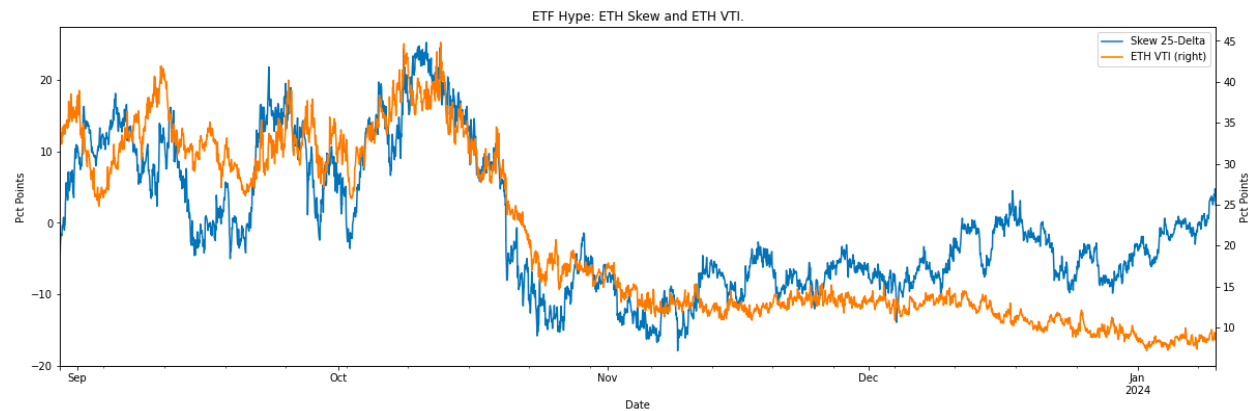


Figure 6b: ETH Skew and ETH Volatility Tail Index (VTI) during ETF Hype period

The relationship between the VTI and skew underwent significant changes, as can be seen in Figures 6a and 6b above, illustrating the evolving market dynamics and investor sentiment in the lead-up to the ETF approvals.

### Initial Phase: Continued Positive Correlations

The market dynamics maintained the positive correlations between VTI and Skew observed prior to this phase. This continued positive relationship indicated that as the market's perception of tail risk (captured by VTI) increased, so did the skew, suggesting a relative increase in the cost of out-of-the-money (OTM) calls over puts, while overall expensiveness of OTM options decreased. This was indicative of a market sentiment that continued to hedge against upward price movements more aggressively than downward movements, a sentiment possibly driven by the anticipation and speculation surrounding the potential approval of Bitcoin ETFs.



## Mid-December Decoupling

A significant shift occurred from mid-December 2023, marking a decoupling in the previously observed positive correlations between VTI and Skew. Until mid-December, the correlations were notably high, at 83.90% for ETH and 71.39% for BTC, reflecting a strong alignment between perceptions of tail risk and the skewness in option pricing. However, this alignment dramatically shifted:

- For Ethereum (ETH), the correlation turned sharply negative to -53.04%.
- For Bitcoin (BTC), the correlation became almost non-existent, dropping to -2.83%.

These later negative correlations suggest that as the overall perceived tail risk (VTI) remained stable, the skew increased, indicating a decrease in the relative cost of OTM calls compared to OTM puts, or a shift in market sentiment towards a more balanced or potentially bearish outlook.

## Implications of the Shift

The mid-December decoupling in correlations between VTI and skew for ETH and BTC has significant implications:

- **Changing Market Dynamics:** The shift from positive to negative correlations signals a profound change in market dynamics, where perceptions of tail risk and option pricing skewness no longer moved in tandem, reflecting a complex reassessment of market risks and opportunities.
- **Sentiment and Speculation:** The decoupling in mid-December highlights a period of heightened speculation and sentiment change, particularly as the market grappled with the implications of the impending ETF decisions and other macroeconomic and regulatory factors.
- **Strategic Considerations:** For traders and investors, especially those involved in options markets, understanding the decoupling and its timing is crucial for adjusting strategies to account for the changing relationship between tail risk and skewness, and for navigating the increased volatility and uncertainty characteristic of this period.

## Post-ETF Hype: A New Phase

Following the SEC's approval of Bitcoin ETFs on January 10, 2024, the "Post-ETF Hype" period commenced with negative price movements in the cryptocurrency markets, marking a departure from the preceding speculation-driven rally.

Despite this downturn in price, implied volatilities went down as well. So, the correlation between implied volatility and prices for Ethereum (ETH) and Bitcoin (BTC) remained positive, though the magnitude of these correlations experienced a notable shift, decreased to 46.48% for ETH and 80.22% for BTC as shown in Figures 7a and 7b below:

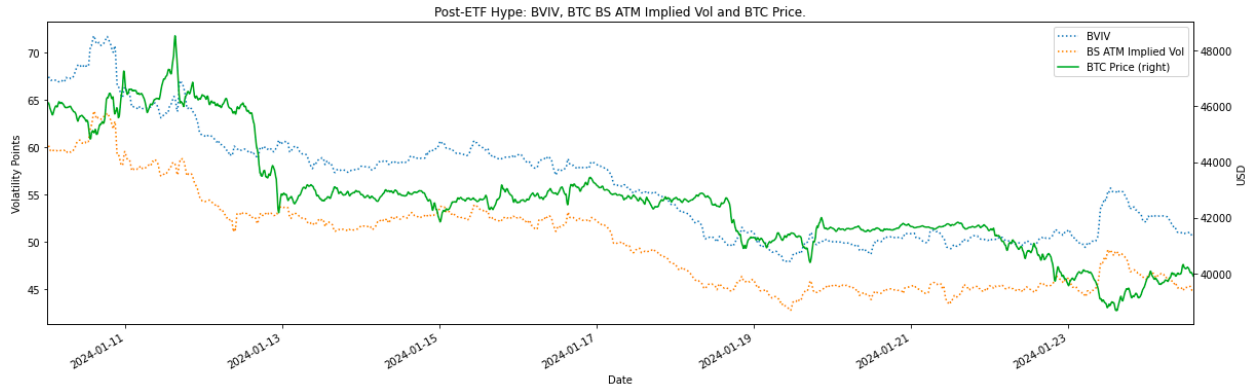


Figure 7a: BVIV, BTC BS ATM Implied Volatility (BSIV) and BTC Price during Post-ETF Hype period

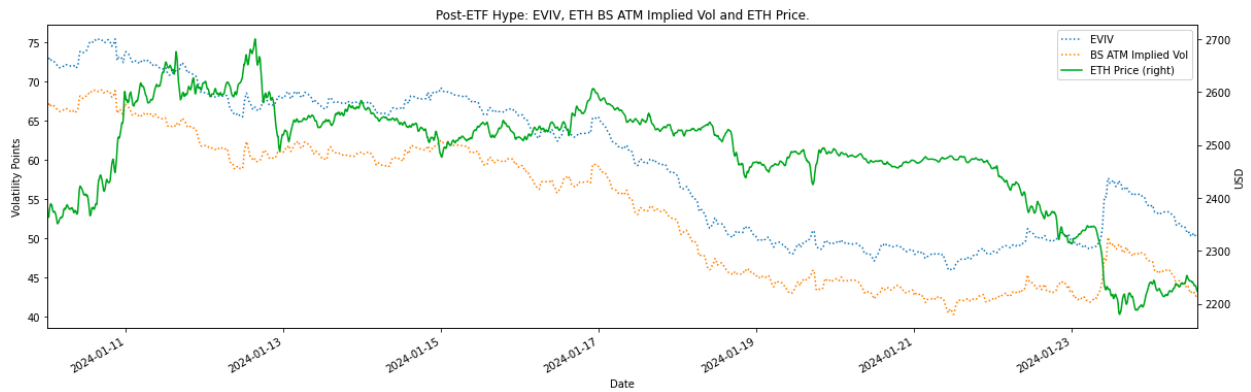


Figure 7b: EVIV, ETH BS ATM Implied Volatility (BSIV) and ETH Price during Post-ETF Hype period

Following the initial excitement surrounding the ETF approvals, the behavior of the VTI for ETH and BTC revealed distinct market reactions and adjustments as can be seen in Figures 8a and 8b below.

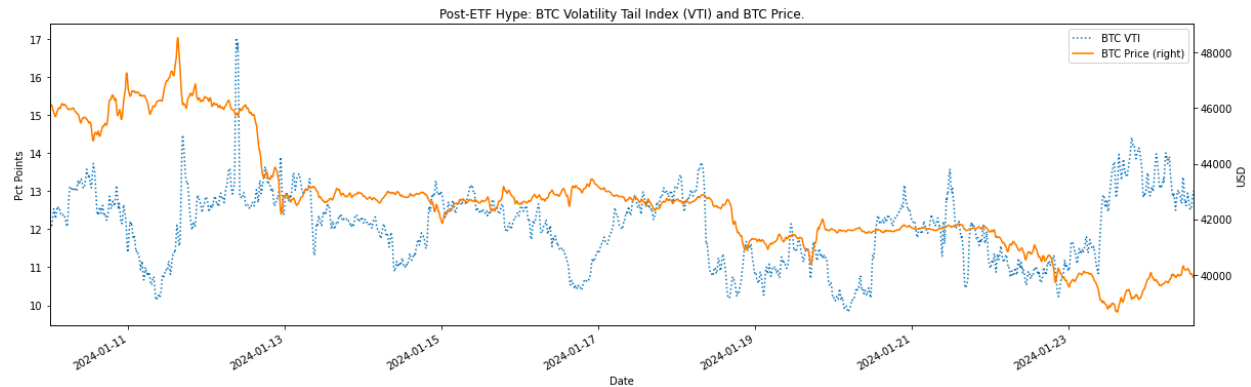


Figure 8a: BTC Volatility Tail Index (VTI) and BTC Price during Post-ETF Hype period

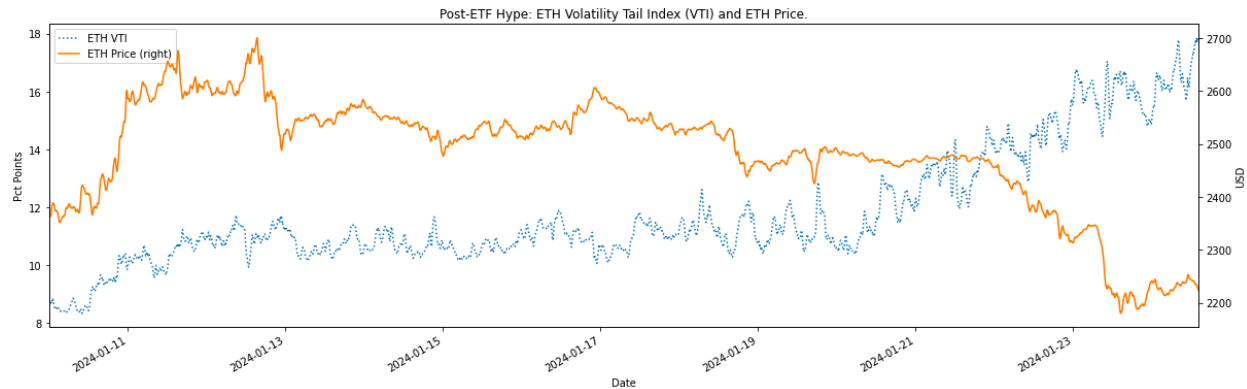


Figure 8b: ETH Volatility Tail Index (VTI) and ETH Price during Post-ETF Hype period

### ETH VTI Dynamics

The ETH VTI experienced a notable increase during this period, moving from below 9% to nearly 18% by January 24, 2024. This significant rise in the VTI suggests an increasing market perception of tail risk (i.e., tail events) for Ethereum. Such a shift could be attributed to various factors, including market uncertainty, or prospective regulatory developments (e.g., SEC decision Ethereum ETF in May 2024) that may have influenced investor sentiment towards the risk of extreme price movements.

The continued high negative correlation between ETH VTI and ETH price, at -72.56%, indicates that as Ethereum's price decreased, the perception of tail risk (as measured by VTI) increased, and vice versa. This strong relationship underscores a heightened sensitivity to risk among Ethereum market participants, with price declines leading to increased concerns about potential tail events.

### BTC VTI Dynamics

In contrast to ETH, the BTC VTI began fluctuating around 12%, suggesting a more stable market perception of tail risk for Bitcoin. This stability in the VTI, amidst the broader market adjustments post-ETF hype, indicates that Bitcoin's market participants may have had a more consistent view of the risk of extreme price movements, possibly reflecting Bitcoin's status after the approval.

The disappearance of the correlation between BTC VTI and BTC price signifies a decoupling in the market's assessment of tail risk from BTC's price movements. This decoupling could indicate that factors influencing Bitcoin's tail risk perceptions have become more diverse or less directly related to its immediate price changes, pointing towards a maturing market perspective that considers a broader range of influences on risk.

## Decoupling between ETH and BTC Options

The divergent behaviors of ETH and BTC VTIs, along with the contrasting correlation patterns with their respective prices, highlight a decoupling between Ethereum and Bitcoin options markets after the approval of Bitcoin ETF applications. This decoupling reflects differing market sentiments, risk perceptions, and potentially the impact of distinct fundamental and speculative factors on each cryptocurrency.

## Market Implications

The distinct dynamics in the ETH and BTC VTIs during this period provide valuable insights for investors, traders, and risk managers.

- For Ethereum, the rising VTI and its strong negative correlation with price emphasize the need for careful risk assessment and management, especially in light of price declines.
- For Bitcoin, the stable VTI and decoupled relationship with price suggest a different risk landscape, where tail risk perceptions may be influenced by a more diverse set of factors beyond immediate price movements.

## Skew Dynamics Post-ETF Approvals

The behavior of skew for both Bitcoin (BTC) and Ethereum (ETH) and its relationship with the Volatility Tail Index (VTI) offers a nuanced view of the evolving market dynamics, as can be seen in figures 9a and 9b below.

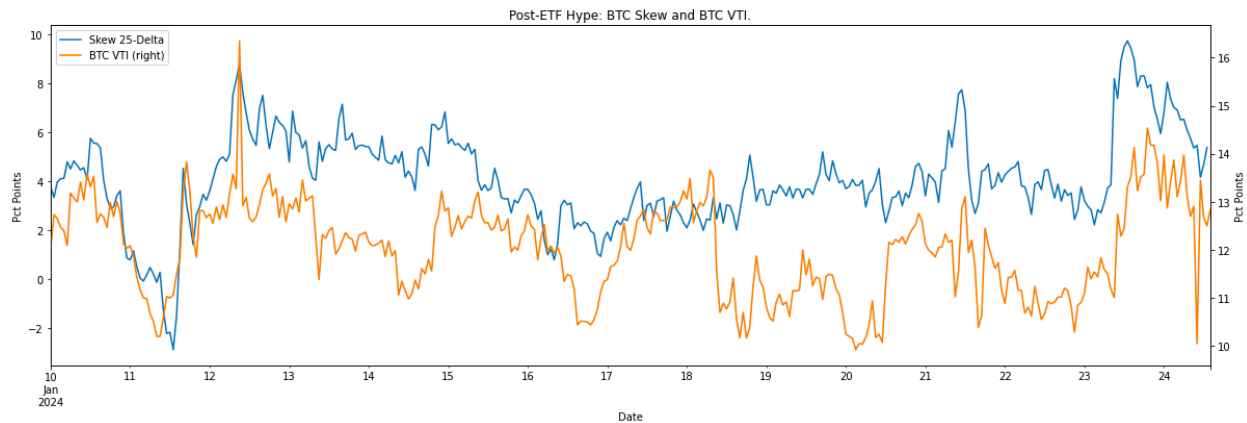


Figure 9a: BTC Skew and BTC Volatility Tail Index (VTI) during Post-ETF Hype period

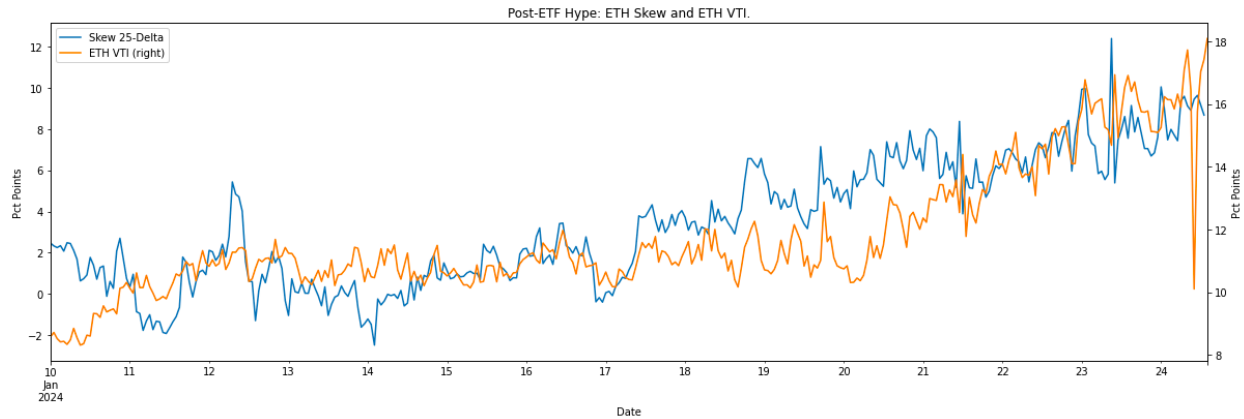


Figure 9b: ETH Skew and ETH Volatility Tail Index (VTI) during Post-ETF Hype period

BTC skew exhibits fluctuations around 4%, indicating a relatively stable market sentiment towards the asymmetry in the pricing of out-of-the-money (OTM) options. This stability suggests that, despite the market adjustments following the ETF approvals, the relative pricing of bullish versus bearish bets for Bitcoin has remained consistent, reflecting a balanced outlook among market participants towards BTC's future price movements.

In contrast, the skew for ETH showed a notable increase, moving from 0% to 10%. This rising skew indicates a growing market inclination towards the relative expensiveness of OTM puts over calls, suggesting a bearish sentiment among Ethereum investors.

## The Insights of VTI

Throughout these periods, the VTI emerged as a critical tool for deciphering market sentiment and expectations. Unlike traditional measures, the VTI provides a unique perspective on market dynamics, particularly in assessing the likelihood of extreme volatility. Its orthogonal features, especially evident during the decoupling events in the ETF Hype period, offer invaluable insights for investors and analysts seeking to navigate the complex interplay of market sentiments, regulatory developments, and external factors.

### Significance of VTI

The VTI offers several key insights:

- **Relative Expectations.** The VTI for ETH and BTC both highlight discrepancies in expectations of option-implied and normal distribution, particularly in the tails of these distributions.

- **Market Sentiment and Tail Risk.** A high VTI value suggests that the market expects significantly more extreme volatility than predicted by the Black-Scholes model, indicating heightened market anxiety or expectation of significant price movements.
- **Orthogonal Indicator:** The VTI provides information orthogonal to traditional volatility measures like skew and implied volatility, offering a unique perspective on market dynamics and risk perceptions.

## VTI in Market Analysis

The utility of VTI extends beyond mere measurement; it serves as a critical analytical tool for deciphering market sentiment during periods of uncertainty or significant events, such as the ETF approval process. By capturing the market's assessment of tail risk, the VTI helps investors and analysts understand the undercurrents of market dynamics, enabling more informed decision-making and risk management.

## Conclusion

The ETF approval process and its impact on cryptocurrency markets underscore the importance of nuanced volatility measures like the VTI. By offering a detailed analysis of market sentiment and risk perceptions, the VTI complements traditional indicators, providing a more comprehensive view of market dynamics.

As the cryptocurrency landscape continues to mature, the adoption of sophisticated tools like the VTI will be pivotal in enhancing market analysis, investment strategies, and risk management practices.

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