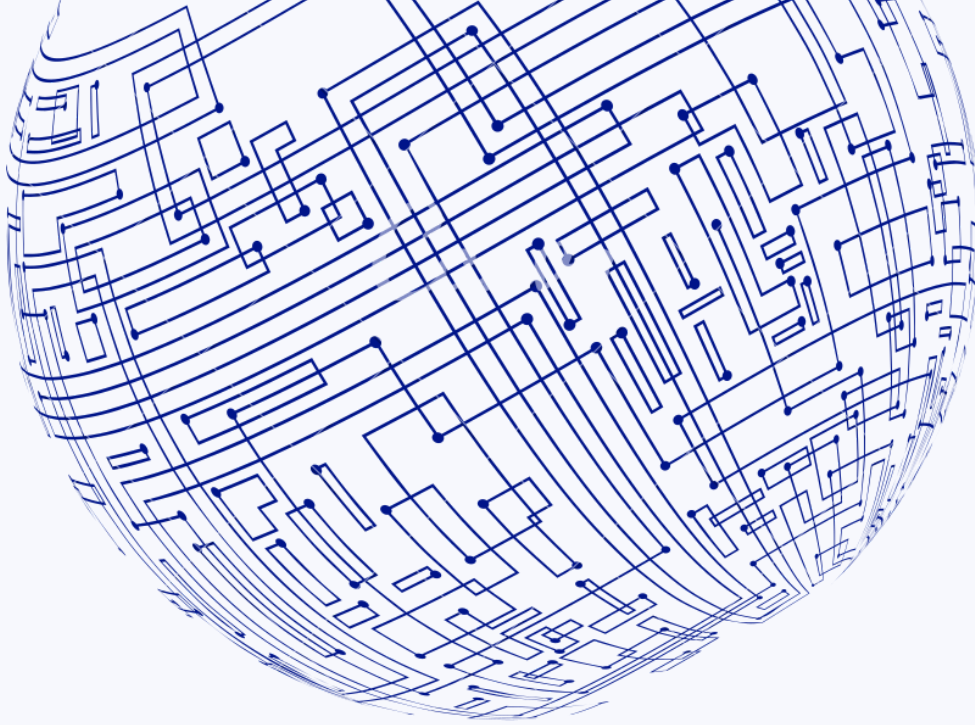


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1ST SEPTEMBER 2023

# Crypto Volatility in Review: August 2023

Two large spot market moves saw implied volatility pick up twice this month. However, neither volatility rally was strong enough to see a sustained move above the lower bound of its historical range. Volatility is priced lower for ETH options, a trend that we have observed since the Merge in September of last year. Whilst in previous months we have highlighted how the fall in ATM vols has led to a steepening of the wings of ETH's smile, this month we observe a material increase in volatility expectations priced by options struck in the wings relative to options struck near-the-money.



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# Ether Moves Smoother



Figure 1 8-hourly BTC (yellow) and ETH (purple) ATM implied volatility at 1 month (darker colours) and 3-month (lighter colours) tenors over the last year. *Source: Block Scholes*

We have seen more of the same volatility regime throughout August that we have seen since the early part of this year: a slow drift sideways and lower punctuated by sharp spikes upwards. Volatility expectations picked up notably twice in August, once during a selloff and once during a partial retrace upwards. However, neither occasion saw vols lifted above their mid-June levels. Nor have we seen the same level of inversion in the term structure of implied volatility (where long-dated expiries trade at a lower implied vol than short-tenor options) that we have come to expect during quick increases in outright volatility.



Figure 2 Daily ratio of BTC ATM volatility to ETH ATM volatility at 7-day (blue), 30-day (grey), 90-day (yellow), and 180-day (orange) tenors since May 2022. *Source: Block Scholes*

Whilst the implied volatility of both assets has been drawing lower, ETH's volatility has fallen even further relative to BTC's. The difference between the volatility markets of both assets grew to a historical extreme this month as ETH options dominated same-tenor BTC options across the term structure, having traded on par over the past few months. As a result, the ratio of BTC implied volatility to ETH's is now above 1 at all tenors on the term structure.

The trend began in mid-September, near to the date of Ethereum's switch to Proof-of-Stake and the Beacon chain on the 15th. Since then, the ratio of BTC volatility has trended consistently higher relative to ETH's at the same tenors.

Historically, ETH's volatility premium over BTC could be explained by the relatively higher volatility that its spot price movements delivered. As we have seen ETH's spot price move with less volatility than BTC since the Merge (even moving with the same level of volatility for a 3 month period between March and June this year) traders have priced their volatility expectations lower accordingly. However, since mid-June we have seen a brief reversal of that trend as ETH's realised volatility has risen above that of BTC's once again.

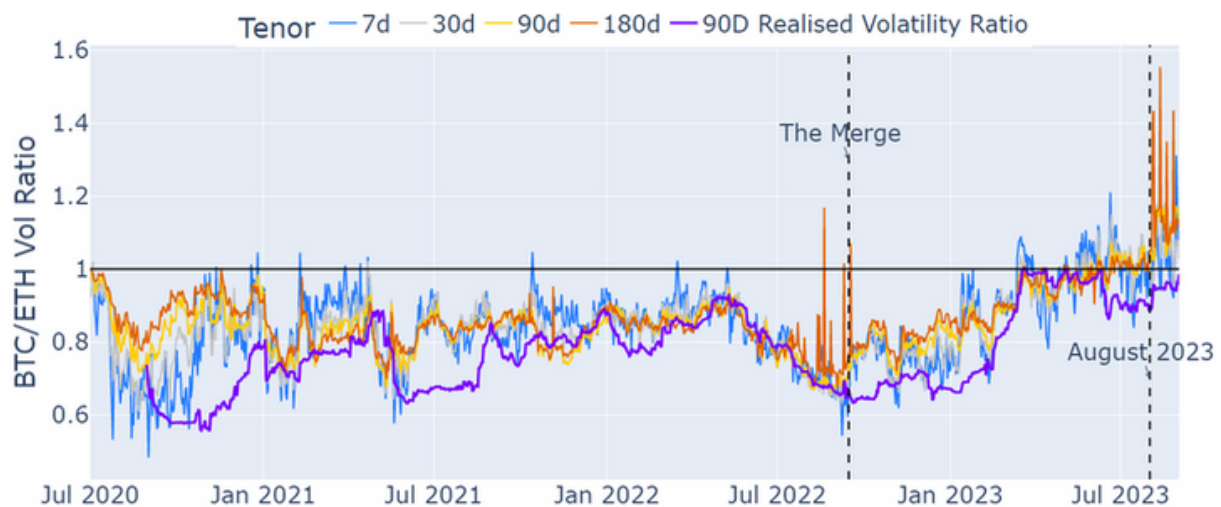


Figure 3 Daily ratio of BTC ATM volatility to ETH ATM volatility at 7-day (blue), 30-day (grey), 90-day (yellow), and 180-day (orange) tenors along side BTC's 90-day realised volatility as a multiple of ETH's 90-day realised volatility since May 2022. Source: Block Scholes

The latest trend in the ratio of realised volatility is at odds with the latest trend in the ratio of volatility expectations. ETH has slightly higher realised volatility than BTC, but this is not being reflected in its volatility expectations. Instead, ETH options markets now price for a lower forward looking volatility than has been delivered in the past 90Ds, whilst BTC's volatility trades at a premium to its recent history.



Figure (4a, left) Daily BTC 90-day realised volatility (brown) and 3-month at-the-money implied volatility in 2023. (4b, right) Daily ETH 90-day realised volatility (dark purple) and 3-month at-the-money implied volatility in 2023.

Source: Block Scholes



# The Smiles are Still Steep

In our review of volatility in July, we highlighted an unusually steep volatility smile in both assets. That steepness has moderated and returned in BTC's surface, and has grown substantially in ETH's. Implied vol in the wings of BTC's smile relative to the at-the-money level is near the top of its historical range, whilst ETH's smile has touched all-time high steepness at a 1M tenor.



Figure 5 4-hourly SABR Vol of Vol (steepness of the vol smile) parameter for BTC (yellow) and ETH (purple) at 1-month tenors over the past year. Source: Block Scholes

In that review we examined the development of the increasing steepness alongside the fall in implied volatility, noting that the wings of the volatility smile had remained relatively still whilst at-the-money strikes had sunk lower. The climb of ETH's smile to all-time high steepness is different: since the selloff in spot prices on the 18th August we have seen a small move lower in ATM vols, but have also observed a novel increase in deeper out-the-money vols. Figure 6 below shows this evolution, with bright colours indicating more recent snapshots.

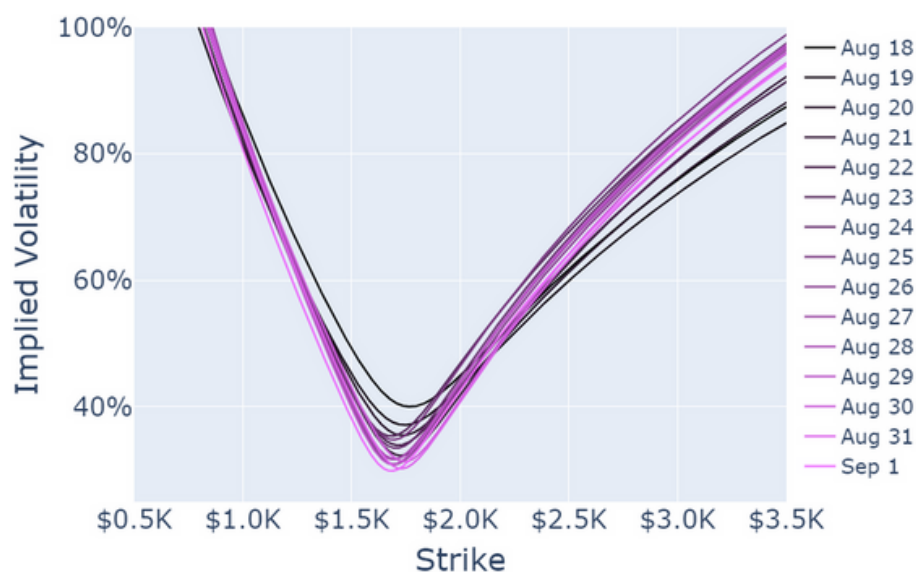


Figure 6 Daily SABR calibrated ETH 1-month tenor volatility smiles from 18th Aug to 1st Sep, with brighter colours indicating more recent snapshots. Source: Block Scholes

The dislocation remains strongest near to the 30-day tenor, just as it was when we first highlighted it on the 4th Aug. Whilst BTC has returned to similar levels to that date, it has not moved to higher levels in the same way.

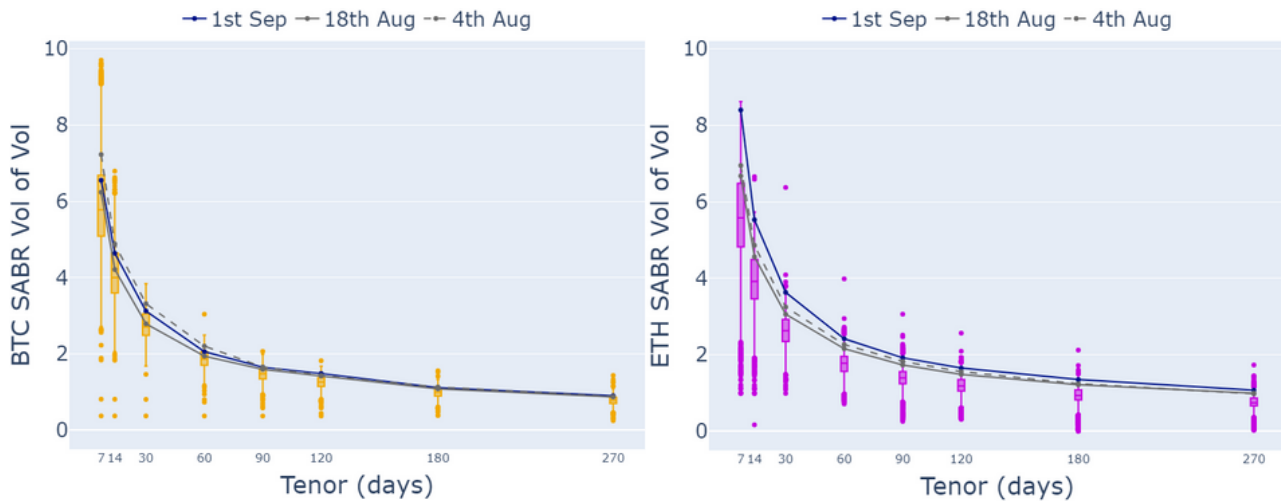


Figure 7 Historical distributions of SABR volatility of volatility parameter at standard tenors for BTC (left, orange) and ETH (right, purple) with the term structure at key dates plotted on top (in black and blue). *Source: Block Scholes*

Traders are braced against further sharp moves in spot prices after first the selloff and then the partial retrace this month on the back of Grayscale's partial lawsuit win against the SEC. Bullish belief in the approval of a spot Bitcoin ETF and the optimism that would bring market-wide is set precariously against an uncertain macroeconomic backdrop which still has the potential to resolve either in a recession or a soft-landing. Low trade volumes and the removal of liquidity in spot markets have caused long periods of sideways price action with infrequent, 15% moves up or down.

Traders have looked to capitalise on (or insure against) the next large swing in price using the higher leverage afforded by trading options in a period when implied volatility is at its lows - a move more prominent in ETH's smile after this month's selloff with the outright rise in OTM vols. Therefore we would expect such a dislocation to remain distinct as long as such market conditions prevail. However, this itself is just as uncertain.

## AUTHORS



ANDREW MELVILLE

Research Analyst

[andrew.melville@blockscholes.com](mailto:andrew.melville@blockscholes.com)



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Block Scholes Ltd.



27 Old Gloucester Street  
London WC1N 3AX



[research@blockscholes.com](mailto:research@blockscholes.com)