MVIV
Market Volmex Implied Volatility Index

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This paper introduces a new aggregate implied volatility index for cryptocurrency markets. It describes how to construct and calculate the index. At Volmex Labs, we implemented this methodology to publish the Market Volmex Implied Volatility (MVIV).

1 Introduction

The dynamic and rapidly evolving landscape of crypto assets has captured the attention of investors, traders, and financial institutions seeking exposure to this innovative asset class. As the crypto market matures, the need for comprehensive tools to assess risk and market sentiment becomes increasingly apparent. One such tool, implied volatility (IV), believed to be the **fear gauge**[1] of investors, simply referring to the volatility that is extracted from (and implied by) options by matching the price of these contracts, has proven invaluable in traditional financial markets for measuring market expectations and risk perception.

The crypto market, characterized by a multitude of cryptocurrencies and tokens, presents unique challenges and opportunities. As investors navigate this complex landscape, a set of holistic measures of market volatility can offer crucial insights into risk dynamics and potential market trends. While individual implied volatility metrics for specific assets such as Bitcoin (BVIV) and Ethereum (EVIV) exist, the construction of a market-wide total and differential implied volatility indices provides a more comprehensive perspective on overall market conditions.

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[1] See Whaley (2000).

Since the volatility of major cryptocurrencies often serves as a barometer for overall market sentiment, making them instrumental in constructing a broader indicator for the digital asset ecosystem, this document presents a methodological approach to calculating a market-wide implied volatility index, called Market Volmex Implied Volatility Index (MVIV).

2 Methodology

MVIV is aimed at creating an easily replicable portfolio of tradable implied volatilities of major cryptocurrencies. It uses individual implied volatilities with weights based on underlying asset market capitalizations.

2.1 Variables

The inputs to MVIV are:

1. **Implied Volatilities**: Volmex Implied Volatility Indices.

2. **Weights**: Market capitalizations of the underlying assets are used as the weights for the implied volatilities.

2.2 Construction

MVIV is a value-weighted average of tradable crypto implied volatilities. Weights are simply the market caps of underlying assets. Given BTC and ETH implied volatility indices, BVIV and EVIV, MVIV can be written as,

$$MVIV = w_{EVIV} \times EVIV + w_{BVIV} \times BVIV \tag{1}$$

where w_{EVIV} is the weight of $EVIV$ and w_{BVIV} is the weight of $BVIV$. These weights are calculated as follows,

$$w_{EVIV} = \frac{MCAP_{ETH}}{MCAP_{BTC} + MCAP_{ETH}} \tag{2}$$

$$w_{EVIV} = \frac{MCAP_{BTC}}{MCAP_{BTC} + MCAP_{ETH}} \tag{3}$$

where $MCAP_{ETH}$ is the market capitalization of ETH and $MCAP_{BTC}$ is the market capitalization of BTC.

2.3 Generalization

We can generalize MVIV with more tradable implied volatilities:

$$MVIV = \sum_x w_x \times xVIV \tag{4}$$

where w_x is the weight of the underlying asset's tradable implied volatility and $xVIV$ is the implied volatility of asset x. Above equation satisfies

$$\sum_x w_x = 1 \tag{5}$$

where w_x is calculated using the market caps,

$$w_x = \frac{MCAP_x}{\sum_y MCAP_y}. \tag{6}$$

3   Conclusion

We introduced in this paper a methodology to capture aggregate total implied volatility of the crypto assets, which could be seen as a single number that summarizes the current uncertainty in the market.

References

R. E. Whaley. The investor fear gauge. *The Journal of Portfolio Management*, 26(3):12–17, 2000.