3SIGMA CAPITAL

Index Coop Proposal

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Herein, the dVIX is proposed: an analogy of the CBOE Volatility Index (VIX), commonly known as the "Fear Index". The VIX is a useful TradFi metric. Not only does it provide an easy indication of sentiment toward future volatility, but it can be traded as a product for hedging a portfolio. Adding this metric to the DEFI universe is now achievable with the maturity of decentralized and trustless option contracts.

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1 Introduction

The CBOE Volatility Index (VIX) index, commonly known as the "Fear Index", is a useful TradFi metric. Herein we propose the dVIX index, a weighted volatility index to measure the volatility of appropriate decentralised assets through via the pricing of decentralised options contracts.

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2 Methodology

Calculation

The daily calculation of the weekly dVIX according to (1) uses a similar methodology to the CBOE VIX calculation. However, given the extremely non-deterministic interest rates associated with decentralised assets, the daily average futures price is used for F, instead of the forward price as is used by the CBOE VIX. This futures price is derived on-chain from the $\delta y/\delta x$ Protocol.

$$dVIX_i = \sqrt{\frac{2e^{r\tau}}{\tau}\left(\int_0^F \frac{P(K)}{K^2}\,dK + \int_F^\infty \frac{C(K)}{K^2}\,dK\right)} \tag{1}$$

The value for $\tau = 7$ is chosen as the number of days in a week. The call and put options contracts as a function of strike price, $C(K)$ and $P(K)$ are aggregated across all decentralised options exchanges such as Hegic and Opyn.

Options contracts largely exist for for wBTC and ETH. Thus, until options contracts for other underlying assets are launched, the dVIX will be calculated according to these two assets, and weighted according to the market capitalisation of the underlying BTC and ETH (note BTC not the ERC20 wBTC). The market capitalisation is calculated as the product of the price and the circulating supply of the asset. The scaling factor of $\sqrt{52}$ is used to annualise the weekly measure.

$$dVIX = \frac{\sum_i M_i \cdot dVIX_i}{\sum_i M_i} \tag{2}$$

The inclusion of selected $dVIX_i$ is at the discretion of the methodologist. If the number of options contracts is sufficiently sparse, the $dVIX_i$ component that is included in the dVIX calculation would be too volatile and adversely affect the dVIX measure.

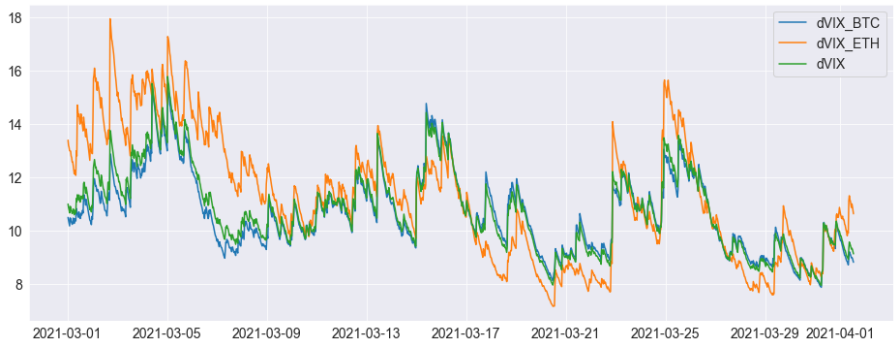

Figure 1: Forward looking weekly dVIX.

Transaction Fees

Transaction fees are dynamic according to the dVIX price up to a maximum of 0.1%, shown by (3). This is to provide the liquidity to allow for peer-to-contract trading.

$$t = A(B + \arctan(C(dVIX - D))) \tag{3}$$

Where empirical scaling factors of $(A, B, C, D) = (0.0396, 1.5, 0.1, 15)$ are used to generate the appropriate range.

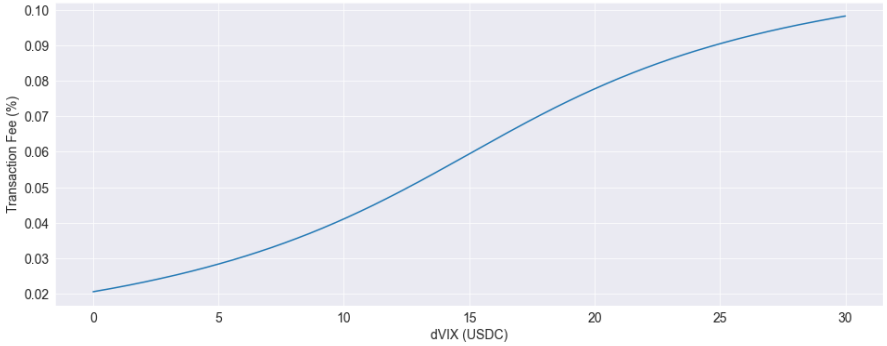

Figure 2: Dynamic transaction fee as a function of the dVIX price.

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