

EVIX: An On-Chain Volatility Trading Primitive (DRAFT)

Lee Mount
@lmount_
mount.lester@gmail.com

May 25, 2022

Abstract

EVIX is a decentralized protocol for trading ETH volatility futures & perpetual swaps using AMM pools as the trading mechanism. With the continued growth of the DeFi derivatives marketplace, there is a growing need for a way to trade volatility directly. By calculating an underlying volatility index and amassing funding payments based on that index, we have a contract that is continuously pegged to the underlying volatility level and allows for direct exposure to volatility fluctuations.

1 Introduction

As DeFi markets continue to evolve, it becomes more important that the ecosystem has all of the necessary trading and hedging building blocks of a mature derivatives market. Volumes of both on and off chain options on crypto underliers continue to grow massively, with volume growing over 400% in 2021 to \$387bn notional across BTC and ETH as more sophisticated players enter the space and retail traders continue to seek more complex products. One of the key building blocks that is missing currently is a product to directly trade volatility exposure, both in a perpetual form and in an expiring form to match the popularity of traditional options. With EVIX, we have built a protocol to offer just that, with a funding & settlement mechanism to keep the products pegged to the underlying index values. Traders will be able to buy or sell the product, allowing for long or short exposure to implied volatility levels, opening up a new realm of trading possibility and yield generation strategies.

2 EVIX Index

For v0 of the protocol and the perpetual contract, calculation is made simple by the fact that we can pull a perpetual implied volatility level from other "option-like" perpetual contracts, such as Opy's Squeeth, where the daily funding rate f is $\frac{\sigma^2}{365}$. Therefore, $\sigma = \sqrt{365 * f}$, which will be used for the EVIX index value.

In the future we plan to include other sources in our index calculation, such as incorporating the implied volatility level that can be backed out of Uniswap V3 pools. For the expiring version of the swap contracts the underlying EVIX index will be calculated in a manner similar to the VIX index in traditional equity markets. The first key formula below comes from the VIX whitepaper and can be applied to other option markets, where an implied volatility level is found by taking a weighted average of non-zero value option prices across strikes for a given expiry date:

$$\sigma^2 = \frac{2}{T} \sum \frac{\Delta K_i}{K_i^2} e^{RT} Q(K_i) - \frac{1}{T} \left[\frac{F}{K_0} - 1 \right]^2 \quad (1)$$

Next, we calculate the value of (1) for for two dates, T_1 less than 30 days to expiry, and T_2 more than 30 days to expiry, then take a weighted average across these two values to find a 30 day implied volatility level:

$$EVIX = 100 * \sqrt{\{T_1 \sigma_1^2 \left[\frac{N_{T_2} - N_{30}}{N_{T_2} - N_{T_1}} \right] + T_2 \sigma_2^2 \left[\frac{N_{30} - N_{T_1}}{N_{T_2} - N_{T_1}} \right]\} * \frac{N_{365}}{N_{30}}} \quad (2)$$

3 EVIX Tradeable Products

3.1 Perpetual Swap

The perpetual EVIX swap will trade similarly to other perpetual products that exist today. There will be no expiry dates, but funding will be paid between buyers and sellers on a regular basis (weekly for V0) out of a trader's collateral position. The funding that will be paid will be the difference between the contract's mark and the underlying EVIX index times the amount of EVIX traded. This funding mechanism will allow and force the perpetual swap to stay pegged to the underlying index on a regular basis as traders will change positions based on funding rates.

3.2 Futures Contracts

Futures contracts will behave similarly to futures contracts in traditional markets with expiry dates and settlements. Expiry dates and times will be lined up with Deribit and other on-chain option market expiry timing to allow traders to align their Vega exposures accordingly. PnL payments will be made on a regular basis similar to normal futures contracts, and at expiry the futures will settle into the current EVIX index level. This settlement mechanism will lead to the futures contracts converging towards the underlying price as expiry approaches.

4 Trading Mechanism, Collateral, and LP Positions

4.1 Trading EVIX Products

For V0 of the protocol, trading will be done in a similar manner to Perpetual Protocol, with a primary central clearinghouse contract and an underlying "virtual" AMM pool as the pricing mechanism. All interactions and changes to positions will be done via the clearinghouse contract in order to maintain a record of collateral levels for all positions that are taken. EVIX will be quoted as $\sigma * 100$, ie. if the calculated volatility level is 80%, the EVIX level will be 80.

4.2 Collateral

The goal of the EVIX trading protocol is to provide an undercollateralized mechanism of gaining direct exposure to volatility. Volatility levels in derivatives markets are of course very volatile themselves, so when deciding a collateral level we have to balance the ability to establish leverage with the security of knowing any buyer/seller has the capital to pay off any losses. To start, USDC will be the only accepted collateral (more to be added in the future), and initial collateral levels will be set at 50% of notional value, with a maintenance margin of 30% of notional value. The protocol will serve as a "clearinghouse", where all traders will post collateral, PnL will be calculated, and settlements will be paid out. On a weekly basis, trade/funding PnL will be calculated and added/subtracted to a users position collateral. If their collateral falls below the maintenance level, a liquidation warning will be put in place for the user. After the liquidation warning has been established, the user will have 12hrs to top up their collateral to the maintenance level, otherwise their position will go through the liquidation process.

4.3 LP Positions

Users will be able to provide liquidity to the EVIX AMM pool by depositing USDC and "borrowing" EVIX based on the current price. The positions earn fees based on traded volume - at the moment, the fee rate will be set to 0.5% of traded USDC volume, allocated to each LP position based on their proportional size of the pool.

5 Future work

The four key features on our future roadmap are: (1) improving index calculation to include other data sources such as Uni V3 pools and other on-chain option markets, (2) adding expiring contracts, (3) expanding to different underliers such as BTC, APE, and other popular coins with vibrant option markets, (4) allowing for collateral beyond USDC, and (5) adding a retail vault strategy. The retail vault will behave similarly to other DOVs that have grown in popularity in recent months, however instead

of just selling short-term volatility, our vault will take advantage of the other DOVs selling 1 week vol by buying 1 week vol futures, and selling 1 month vol futures. In normal markets, longer dated vol will trade at a premium to shorter term vol, so by selling 1 month we hope to make money on the contract prices coming down over time. To hedge these positions, the vaults will buy 1 week vol, which will be priced at a discount to 1 month vol thanks to the large amount of short dated selling from DOVs, so traders and market makers taking the other side of those trades would be willing to offload short dated vol at a discount.