Levswap: A Novel Synthetic

Leveraged Token Exchange

Introduction

Leverage is an inherent and essential part of modern financial systems. Traders can use a series of financial derivatives for leverage, such as options, futures, and perpetual contracts. While users trade with leverage, they can amplify their returns on one side, but they also increase their risks on the other side. In a rapidly changing market, traders using leverage may be forced to liquidate their positions and lose all their assets.

As a noval leveraged derivative, leveraged tokens lower the threshold for users to use leverage, making leverage trading as easy as buying and selling tokens, and avoiding the risk of asset zeroing caused by forced liquidation.

The current leveraged token products launched by centralized exchanes are designed based on futures or leveraged trading markets. Buying leveraged tokens is equivalent to buying the underlying financial derivatives. The exchange will automatically adjust the position of the underlying assets corresponding to the leveraged tokens to maintain the three times leverage of the leveraged tokens. If the net value of the underlying assets rises, the exchange will automatically increase the position for the leveaged token and vice versa. However, the current leveraged token products provided by centralized exchanges are adjusted daily, and the underlying asset positions cannot be adjusted in time according to market conditions, which increases the risk of leveraged token holders.

We provide users with a noval decentralized synthetic leveraged token exchange that allows users to synthesize and trade leveraged tokens of any asset. The synthetic leveraged tokens we designed have the following advantages:

1. Decentralization, no censorship, no KYC

2. Allow users to synthesize and trade leveraged tokens of any asset

3. Automatically adjust leverage ratio (volatility around 3X)

The Principle of Leveraged Token

Leveraged token holders get excess returns compared to just holding spot through the increase in leveraged token prices.

Given that the price of leveraged token is y, the price of spot is x, and the leverage ratio is k, then the relationship between the price of leveraged token and spot should be as follows:

$$\frac{dy}{y} = k\frac{dx}{x}$$

The theoretical relationship between the price of leveraged token and the spot price can be obtained by solving the above equation:

$$y = cx^k$$

While the price changes, long leveraged token holders and the short holders are counterparties to each other in a zero-sum game, that is, in the rising market, all the profits of long come from the loss of short. The zero-sum game between long and short can be expressed by the following formula:

$$TotalValueOfLong + TotalValueOfShort = ConstantValue$$

Given that the situation of spot, long and short leveraged token in the current market is shown in the table below:

	Price	*Amount*	*Leverage Ratio*
Spot	x	-	-

Long Leveraged Token	y1	n1	k1
Short Leveraged Token	y2	n2	k2

According to the constraints of the leveraged token price and zero-sum game, the following equations can be obtained:

$$\begin{Bmatrix} \frac{dy_1}{y_1} = k_1 \frac{dx}{x} \\ \frac{dy_2}{y_2} = -k_2 \frac{dx}{x} \\ n_1 * y_1 + n_2 * y_2 = C \end{Bmatrix}$$

By differentiating the formula, we get:

$$\begin{Bmatrix} \frac{dy_1}{y_1} = k_1 \frac{dx}{x} \\ \frac{dy_2}{y_2} = -k_2 \frac{dx}{x} \\ n_1 dy_1 + n_2 dy_2 = 0 \end{Bmatrix}$$

By solving the above equations, we can get the relationship between the leveraged token's price and the spot price:

$$\begin{Bmatrix} y_1 = cx^{k_1} \\ y_2 = cx^{-k_2} \\ n_1 y_1 k_1 = n_2 y_2 k_2 \end{Bmatrix}$$

We can get from the results that in order to ensure a zero-sum game between long and short, a dynamic leverage ratio, k1 and k2, is required. The leverage ratio depends on the current market forces of long and short. The current long and short market forces are:

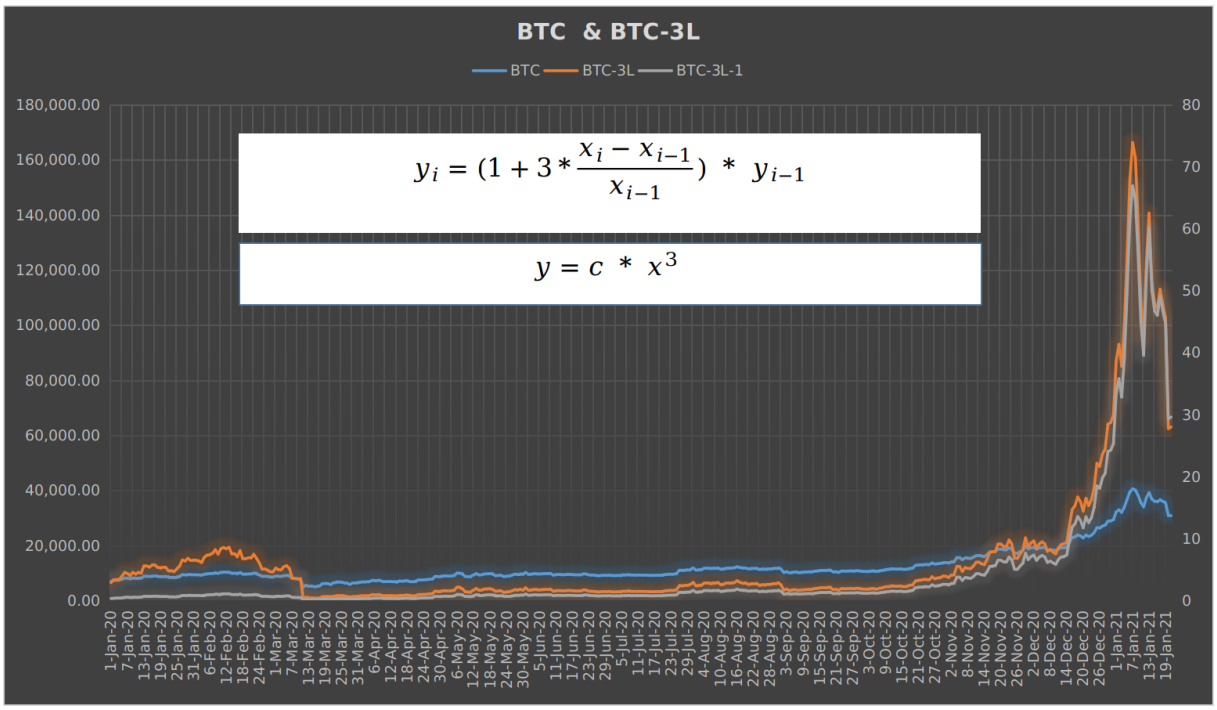
$$\begin{Bmatrix} E_{long} = n_1 y_1 \\ E_{short} = n_2 y_2 \end{Bmatrix}$$

If the leverage ratio of the leveraged token is 3X, it means that k1 = k2 = 3 in the long-short equilibrium. When the long and short forces are not equal, the leverage ratio fluctuates around 3. We can take the following values for the dynamic leverage ratio to ensure that the positive leverage ratio fluctuates around 3:

$$\begin{cases} k_1 = \frac{3}{2} * \frac{E_{long}+E_{short}}{E_{long}} \\ k_2 = \frac{3}{2} * \frac{E_{long}+E_{short}}{E_{short}} \end{cases}$$

Through the above theoretical analysis, we have derived the theoretical model of leveraged tokens, and we have designed our leveraged token trading system using the above theoretical model.

We use the theoretical model to do a retrospective analysis of the price of BTC in 2020. The results are shown in the figure below. Obviously, if you hold BTC3XLONG leveraged coins, you can get several times the income of just holding BTC in 2020 and even in the extreme market on March 12, 2020, there was no forced liquidation.



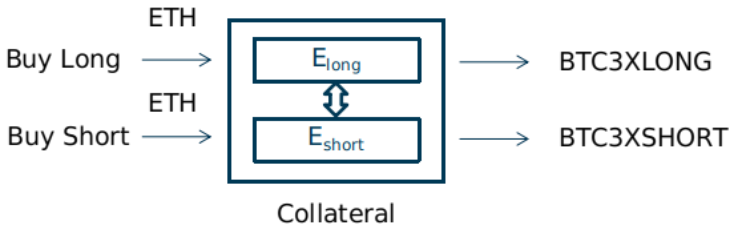
Leveraged Token Design

Levswap supports the synthesis and trading of leveraged token of any asset. We take BTC as an example to introduce the principle of leveraged token design. BTC 3x long leveraged token is named BTC-3X-LONG, and 3x short leveraged token named BTC-3X-SHORT.

Leveswap calculates the price of the leveraged token based on the current

long/short market forces and the spot price queried from price oracles such as Chainlink, Uniswap, etc. Levswap gets prices from multiple oracle sources and calculates the time-weighted accumulated price as the spot price of the system to prevent price manipulation by whales.

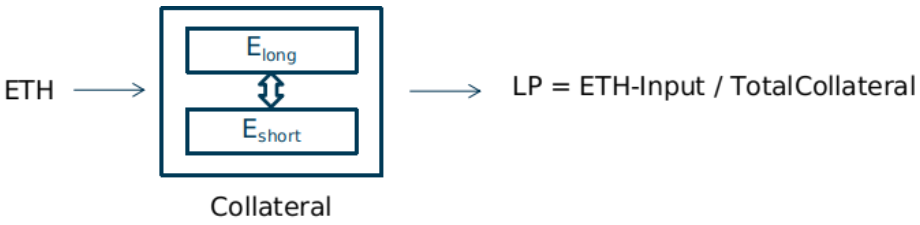
Users can buy long or short leveraged tokens through ETH in Levswap. The process of buying leveraged tokens is equivalent to the protocol using ETH as collateral to issue leveraged token debts. Long and short leveraged tokens correspond to a common ETH collateral pool, when the price of leveraged tokens changes, the two parties holding long and short leveraged tokens will automatically become opponents of the game. While a user sells leveraged tokens, it is equivalent to redeeming ETH at the price of leveraged tokens. Through the above-mentioned buying and selling processes, it can be guaranteed that all leveraged tokens issued by Levswap are supported by ETH's value.



Liquidity

Users can provide liquidity to Levswap for incentives consisted of leveraged token transaction fee and governance token.

When users provide liquidity, they only need to provide ETH to the protocol instead of both ETH and leveraged tokens. This part of ETH will be used to balance the long and short market power. The liquidity provider will receive a liquidity share calculated based on the total amount of the mortgage pool.



Users can provide liquidity to Levswap without worrying about the loss caused by price changes. While the leveraged token's price changes, the long and short sides form the opponents of the zero-sum game, so that the total value of the long and short side does not change. User's LP share is calculated based on the the entire collateral pool which does not change, so LP providers will not incur losses.

Dynamic Fund Fee

In an extreme unilateral market, the long and short power imbalance will cause the leverage ratio to deviate from the theoretical value. Therefore, it is necessary to adopt a dynamic fund fee to allow the strong market side to subsidize the weaker side to create arbitrage opportunities to achieve the return of long and short power in a balanced direction.

Levswap charges dynamic fund fee by the deflation mechanism. For example, if the bulls in the current market are stronger, then the long-leveraged tokens in the market will be burned linearly according to time, and the burned value will be converted into ETH to subsidize short leveraged token holder.

The dynamic fund fee is composed of two parts, namely the fixed interest and the long-short imbalance fee. The fixed interest is charged at a fixed rate for holding long or short leveraged tokens, and the long-short imbalance fee is used to balance the long and short power in the market.

Long and short imbalance rate:

$$delta = c\frac{E_{long} - E_{short}}{E_{long} + E_{short}}$$

Dynamic fund rate of long side:

$$DFR_L = -0.03\% - delta$$

Dynamic fund rate of short side:

$$DFR_S = -0.03\% + delta$$

LevSwap provides an interface to provide a one-click arbitrage interface for market makers. Arbitrageur can hold subsidized leveraged tokens in the protocol, and at the same time hedge unilateral risks in other markets, thereby obtaining a stable arbitrage mechanism to help balance the long and short market power.

Next

LevSwap provides a easy-to-use decentralized synthethic leveraged token exchange for the DeFi world. Users can obtain leverage on LevSwap just like buying and selling tokens to amplify their own profits.

Next, we will fully invest in the project realization of the protocol to bring our products online as soon as possible.