# CoFiX V2.0 Upgrade Document

## About Hedging

CoFiX V1.0 requires LPs to perform perfect hedging, there are several problems here: the first one is that most LPs don't know how to hedge, or can't do automatic hedging. Secondly, there is still a certain cost for hedging, such as the service charge of 0.002, etc. Moreover, hedging requires additional preparation of certain assets in exchanges or hedging channels, which poses certain challenges to LPs. When the market is not so effective, the implicit cost of hedging is not low. Therefore, we plan to introduce the idea of arbitrage hedging in V2.0.

## Arbitrage Hedging

Arbitrage hedging requires the asset ratio of the trading pair to remain constant. For example, the initial asset ratio of the trading pair ETH/USDT is 1:500, that is, 1ETH=500USDT, and the entire pool is required to maintain this ratio during the operating (when the market makers join, it is necessary to deposit the bilateral assets according to the initial ratio). Once the trader destroys this ratio, a certain incentive is given to the trader who reversely trades to the initial ratio, and the incentive continues to strengthen along the time until these traders can cover the cost of hedging. This operation of traders is called arbitrage hedging.

## Hedging Mining Algorithm

Compared with CoFiX V1.0, the difference between the hedging mining algorithm is that instead of rewarding mining for each transaction, it incentives arbitrage hedging behavior. The incentive algorithm is as follows:

**Definition:** The number of ETH in the pool after the $t^{th}$ transaction is $E_t$, the amount of USDT is $U_t$, the price of the $t^{th}$ transaction is $P_t$, that is, the price of ETH is calculated in USDT.

1) The proportion of pool assets after the $t^{th}$ transaction is:

$$\boldsymbol{k_t = U_t / E_t}$$

Among, $k_0$ is the initial proportion of pool assets.

2) Transaction mining formula

$$\begin{cases} \boldsymbol{Y_t = Y_{t-1} + D_{t-1} * n_t * (S_t + 1) - Z_t} \\ \boldsymbol{Z_t = [Y_{t-1} + D_{t-1} * n_t * (S_t + 1)] * v_t} \end{cases}$$

Formula notes:

1. $Y_t$ is the total transaction output at time t, and is the single transaction output at time t.
2. The standard output for each unit of ETH is $n_t$, current.
3. $D_t$ is the ETH transaction scale required when $k_t$ is adjusted to $k_0$ at time t, the formula is:

$$\boldsymbol{D_t = \left| \frac{E_t * k_0 - U_t}{k_0 + P_t} \right|}$$

Note: Pt does not introduce K value here, and it needs to be introduced later

4. $S_t$ is the block interval between t and t-1 transaction.

5. $v_t$ is the mining coefficient of the single transaction, and its calculation formula is:

$$\boldsymbol{v_t = \begin{cases} \frac{D_{t-1} - D_t}{D_{t-1}} & D_{t-1} > D_t \\ 0 & D_{t-1} \leq D_t \end{cases}}$$

**Distribution of transaction output:**

1) 10% of the transaction output $Z_t$ goes to the node mining pool.

2) 90% belongs to the trader.

**Market Making Mining Output**

1. Each block of the NEST/ETH pool generates 3 CoFi;

2. 1 CoFi for ETH/USDT

3. 1 CoFi for ETH/HBTC

10% of the market making ore output flows to the cn node, and the other is distributed to the market makers.

**Market Maker Share Calculation and Withdrawal**

Market makers deposit bilateral assets according to the initial ratio $k_0$, so the calculation of the share is relatively simple, and it can be calculated according to the entered ETH. And the net value of each share is calculated according to the following formula:

$$\boldsymbol{NV = \frac{E_t + U_t/P_t}{\left(1 + \frac{k_0}{P_t}\right) * F_t}}$$

Among them $F_t$ is the total share of the pool, $P_t$ is the effective price of NEST that has not passed the K value. The assets withdrawn are returned to the bilateral assets according to the proportion $k_0$, and if the balance is not enough, the maximum extractable share is returned.

Note: Pt does not introduce K value here, and it needs to be introduced later

**DAO Governance**

DAO governance is mainly aimed at the followings:

1. **Code revision and upgrade:** Multi-signature was adopted in the early stage, and then gradually turned to voting. The core is the voting standard. Currently, NEST uses 51% and the agreed effective period (for example, 5 days, please refer to NEST voting for details).
2. **Determination and distribution of mineable assets:** this part is the most important part of DAO, the standard for voting to take effect

1) Determine the assets to be mined, and the commission will enter the dividend contract. The standard must be completely clear. It is best to be provable on the chain. Otherwise, the contract is required to switch between mining and non-mining smoothly and without contradiction.
2) For assets that are not mined, the commission directly enters the asset pool (there is no automatic hedging algorithm for the time being, and the discount sales function may be added in the future to automatically hedge)
3) The voting ratio needs to be carefully designed, which has not been fully determined yet

3. **DAO account management:** repurchase (this upgrade cancels dividends)
   1) DAO account holds two kinds of assets: CoFi and ETH
   2) Functions of DAO account

      Repurchase: Anyone can sell COFI to DAO according to the CoFi price of the NEST oracle.
   3) Execution of DAO account

      Repurchase operation: Any CoFi holder A can transfer CoFi to the DAO account and get ETH according to the following rules:

      Repurchase price: NEST oracle price CoFi

      Repurchase scale: Each block releases 50CoFi repurchase quota, which will accumulate with the block, and it will no longer increase to 300 blocks (someone needs to buy back a part and continue to release up to the total amount of 300 blocks)

Repurchase constraints: When the current price of CoFi in the NEST oracle differs from the average price by more than 5%, repurchase is not allowed

CoFi destination after repurchase: temporarily stored for future destruction

Each time operating repurchase call the oracle data, the repurchaser needs to pay the calling fee.

**Upgrade Arrangements**

In the future upgrade of CoFiX, we hope to achieve the following principles:

1. The asset pool remains unchanged, avoiding withdrawing and re-depositing such operations.

2. Deploy first, then trigger.

3. The community has an upgrade process that has been verified and trained.

**Calculation of K Value**

$$\boldsymbol{K} = (0.00001 * T + 10 * \sigma) * \gamma(\sigma)$$

among,

1. $\sigma$ is Volatility in seconds

2. T is the time delay: T = (the height of the successfully packaged block-the height of the block where the latest effective NEST price is located) * timespan

3. The formula of $\gamma$ as follows:

$$\boldsymbol{\gamma} = \begin{cases} \mathbf{1} & \boldsymbol{\sigma \leq 0.0003} \\ \mathbf{1.5} & \mathbf{0.0003 < \sigma \leq 0.0005} \\ \mathbf{2} & \boldsymbol{\sigma > 0.0005} \end{cases}$$

### Impact Cost

When the size of the CoFiX asset pool is large enough, it is difficult for a single transaction or cumulative transaction per unit time to reach the upper limit of assets, but a single large transaction volume may affect the hedging cost of market makers. Therefore, a certain price difference should be paid for transactions with a larger amount per unit time. This price difference is called the impact cost C (the effect of a given transaction volume on the price). Without considering the K value when the impact cost is added, plus the impact cost, the value of the price difference compensation coefficient $K_m$ for the market maker is obtained:

$$K_m = K + C$$

Since market makers can hedge transactions on all exchanges in the entire market, the impact cost here must take into account the transaction conditions of the entire market. Therefore, under normal trading behavior, it is unlikely to happen. Only huge transactions are needed, and its scale depends on Based on the trading depth of the exchange, the following linear formula can be used to estimate the impact cost:

$$C = \alpha + \beta * VOL$$

Among them, VOL is the number of lots traded. Based on the in-depth market data of the top ten digital currency exchanges buying and selling ETH, the estimated results are as follows:

$$\alpha = 0, \quad \beta = 0.000002$$

When the transaction volume is small, the impact cost can be ignored. The calculation formula of C is set as follows:

$$C = \begin{cases} 0, & VOL < 500/\gamma \\ (\alpha + \beta * VOL)\gamma, & VOL \geq 500/\gamma \end{cases}$$

Among them, γ is a single currency parameter. When the currency is ETH, USDT, HBTC, γ is 1, and NEST is 20.

### Risk Disclosure

If you want to provide liquidity for the CoFiX 2.0 protocol (becoming a user/smart contract of the liquidity provider), you need to fully understand the market-making rules and the following risks. Users who do not understand the rules or cannot bear the risks are not recommended to participate:

1. To provide liquidity for the fund pool with hedging transactions, it is necessary to deposit bilateral assets. In extreme cases, LPs will suffer losses. For example, the

amount of bilateral assets in the fund pool is too large (not enough hedge transactions), resulting in no way to withdraw bilateral assets in accordance with the original ratio, which may cause certain losses at this time. COFiX 2.0 can only reduce the impermanence loss of market making, but cannot completely avoid impermanence loss;

2. The ratio of bilateral assets in the fund pool with hedging transactions cannot be exactly the same as the initial ratio. Therefore, users who finally withdraw the liquidity will not withdraw bilateral assets in accordance with the original ratio, which may cause certain losses;

3. To provide liquidity for fund pools without hedging transactions, need to deposit unilateral assets. Unilateral assets will have net loss when asset prices fluctuate. Therefore, LPs will have impermanent losses. LPs must be manually hedged to reduce or avoid impermanence loss;

4. LP share calculation uses the oracle price, which may deviate from the exchange price to a certain extent, causing the expected share and the actual share to be inconsistent, especially when the NEST oracle quotation density is small, the risk is more obvious. LP can choose to purchase or redeem after the NEST price take effect (for example, within 20 blocks) to reduce the risk;

5. Although LP providers can obtain COFI Token as a reward, the rate of return is unknown. This depends on the value of COFI itself. COFI itself has a huge risk of market fluctuations, which may be zero in extreme cases, so market making is not necessarily can be rewarded;

6. The price of the CoFiX protocol comes from a third-party oracle. If the oracle machine is attacked or the price is abnormal due to other reasons, the system may have the risk of risk-free arbitrage (although the system model has been multi-layered protection), once the system has arbitrage risks will bring risks to all LPs;

7. Once the smart contract hides the undiscovered bug, it will cause unexpected risks. Because the blockchain system itself has the characteristics of non-tampering, the bug may not be repairable, and all participating users/smart contracts need to understand the risk;

To enter the CoFiX 2.0 protocol, users/smart contracts participating in hedging transaction mining need to fully understand the rules of hedging mining and the

following risks. Users who do not understand the rules or cannot bear the risks are not recommended to participate:

1. Only reverse trading (return the proportion of bilateral assets in the fund pool back to the original ratio) can obtain mining rewards. Positive trading does not have mining rewards. Users/smart contracts need to understand the rules of hedging mining to avoid trading losses;
2. The mining rewards of hedging transactions are related to the amount of asset deviation, so the amount of COFI obtained by mining is not fixed. Users/smart contracts need to fully understand the mining calculation rules and calculate their own benefits and costs;
3. In the CoFiX 2.0, there is a spread in the actual exchange price of assets, and the spread is composed of impact costs and compensation coefficients. Therefore, the transaction price in CoFiX may have a large gap with the centralized exchange, causing "disguised loss";
4. The price of COFI Token may fluctuate greatly, or even return to zero, so hedging transaction mining may not be able to obtain benefits;
5. Like market-making risks, undiscovered vulnerabilities in external oracles and smart contracts are also potential risks.

To enter the CoFiX 2.0 protocol, users/smart contracts participating in the transaction need to fully understand the transaction rules and the following risks. Users who do not understand the rules or cannot bear the risks are not recommended to participate:

1. The price of the CoFiX 2.0 protocol comes from a third-party oracle, which will deviate from the centralized exchange;
2. There is a spread between the actual exchange price of the transaction and the price of the oracle, and the spread will increase the transaction cost. Therefore, the amount obtained in transactions may be less than that in the exchange;
3. The transaction needs to call an external oracle machine to obtain the price, so it is necessary to pay the oracle call fee, which is an additional transaction cost;
4. In extreme cases, such as long-term pending transactions, CoFiX 2.0 will fail to trade, and the miner fee will be collected by the Ethereum system and will not be refunded.