

Cruise Finance: Tokenized Asset Hedging

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Abstract

Cruise enables tokenized asset hedging to provide price protection on volatile assets while unlocking their liquidity for further use. Price pegged wrapped tokens called crTOKENs (ex - crETH for ETH) are minted for hedged assets that have a dynamic price floor of 85% of the market price. The price floor is derived in real time and dynamically adjusts with fluctuating markets. The protocol uses stablecoins to hedge assets and maintains a reserve of USDC to conserve the price floor at the time of withdrawal. The idle capital of the hedged assets is also routed to generate interest on the staked balance which is distributed pro-rata to crTOKEN holders. The protocol thus enables the creation of a new asset class wrapped on top of staked tokens that is price protected, generates interest earnings and is also usable across the broader ecosystem.

Contents

1 Introduction	2
2 Cruize Protocol	3
2.1 crTOKENs - Interest Bearing Hedged Assets	3
2.1.1 Minting crTOKENs	3
2.1.2 Trailing Protection	4
2.1.3 Passive Earnings	4
2.1.4 Market Utility	5
2.1.5 Reclaiming Assets	5
2.2 Stablecoin Pool	5
2.3 CRUIZE Token	6
3 Protocol Modules	7
3.1 Smart Treasury	7
3.1.1 CRUIZE Buyback	7
3.1.2 Rewards Distribution	8
3.2 Shortfall Mitigation Module	8
3.3 Liquidity Provision	9
4 Incentivisation Mechanisms	10
4.1 USDC Liquidity	10
4.2 CRUIZE Staking	10
4.3 LP Staking	10
5 Protocol Architecture	11
6 Protocol Fees	11
6.1 Hedging Fees	12
6.2 Yield Generation	12
7 Potential Risks & Mitigation	12
7.1 Oracle Pricing	12
7.2 Technical Risks	12
8 Conclusion	12
References	13
9 Disclaimer	12
9.1 No Investment Advice	13
9.2 Accuracy of Information	13
9.3 Non Endorsement	13

1 Introduction

Most observers of cryptocurrency markets will agree that crypto volatility is in a different league altogether. Compared to stock market indices like S&P 500, the skyrocketing peaks and depressive troughs become pretty clear as they occur at a quicker and more extreme pace in crypto prices compared to prices of assets in mainstream markets. Leverage is one of the main reasons why retail investors end up having a drastic influence on the market. Leveraged crypto trading has essentially created a market in which neither investors nor traders know absolutely for sure what the “fundamental” base values of cryptocurrencies are. This is also what allows for the peaks and troughs during market movements compared to traditional assets. Cryptocurrencies embody innovative technology, high security architecture, prosperity in functionalities, and investment opportunity as an asset which makes them attractive for computer scientists, venture capitalists as well as investors. However, the decentralisation and unregulated markets add an additional layer of uncertainty to its pricing and projection of appreciation. Examples are the closures of exchanges in China based on changing legal situations which cause worldwide price reactions of large magnitude. Especially in the last few years, large shocks and a bubble-like price movement are observable. Long-term confidence in cryptocurrencies remains high, however, with a recent survey of FinTech experts revealing more than half believe bitcoin is capable of becoming the global reserve currency by 2050.

The rise of decentralised finance (DeFi) has removed the control banks and institutions have on money, financial products, and financial services. Anyone with an internet connection can lend, trade, borrow and generate passive earnings using software that records and verifies financial transactions in distributed ledgers. However, the market is fragmented in terms of offerings that provide additional functionality on assets while enabling productivity such as adding a layer of hedged security to prevent drops in value while they are staked for interest generation. While generating interest, the staked tokens still remain vulnerable to market volatility and are therefore subject to undesirable price fluctuations based on market movements. In most cases, this results in impermanent losses where the staked tokens lose value compared to simply holding the tokens.

2 Cruise Protocol

Cruise is the first decentralised protocol that enables tokenized asset hedging to unlock liquidity for price-protected assets. The protocol adds a permanent price floor to assets while making them usable and generating interest earnings on them.

2.1 crTOKENs - Interest Bearing Hedged Assets

2.1.1 Minting crTOKENs

crTOKENs are minted and distributed to the user every time an asset is staked in the Cruise contract. For example, a user staking WETH in the protocol will receive a corresponding amount of crWETH that is minted and pegged in market price to WETH. Thus, every crTOKEN is a tokenized version of the staked asset that is hedged and represents a claim on both the hedged asset as well as the interest generated on it. Every crTOKEN is a liquid wrapper for the staked underlying token and can be transferred, traded, or used across other applications.

2.1.2 Trailing Protection

The protocol hedges assets by effectuating a dynamic price floor of 85% on the staked assets. 85% is used as the de facto price floor for hedged assets so that crTOKENs can be fungible and interchangeable. Using different price floors at the time of staking would encode different properties to the minted crTOKENs and therefore create different contracts for each token. This would segregate their liquidity as crTOKENs from different contracts would require the creation of different markets across decentralised finance. Having the same price floor means that every crTOKENs is interchangeable and can easily be used to create liquid markets across other applications.

The price floor is dynamic and adjusts to market movements in real-time using a mechanism similar to trailing stop orders. When the market follows an upward trend, the price floor moves with it to readjust to 85% of the new high, but it sticks when the markets start falling. This ensures that the price floor only readjusts if the price moves favourably. Once it sticks to lock in a new peak value or reduce a loss, it does not move back in the other direction.

The price protection enforced is permanent and remains active till redemption. Protection is triggered only when markets fall below the price floor which ensures that the staked assets are exposed to rising markets, but are hedged when markets start falling. Due to this, crTOKENs are perpetually hedged against adverse price movements and always make it possible to exit a position favourably.



Fig 1. Price chart without price protection



Fig 2. Price chart with price protection

2.1.3 Passive Earnings

The time value of the staked assets would be higher if they were used to generate interest rather than remain locked in the protocol. The protocol solves not just for capital inefficiency but also for passive yield generation. The staked assets are routed to lending pools in protocols such as Compound and Aave till redemption is exercised. This optimises the value generation of crTOKENs as hedged assets also generate passive earnings through trusted lending pools. In effect, crTOKENs grow in value with rising markets, stem losses when markets fall, and generate interest in all market conditions. In addition, crTOKEN holders also earn CRUIZE rewards at a variable rate which are distributed from the smart treasury at every epoch. This is what makes crTOKENs a better alternative to holding or using the underlying hedged asset.

2.1.4 Market Utility

For every token that can be hedged, their corresponding crTOKEN will be fungible and usable like other ERC-20 tokens. Every crTOKEN having the same real-time price floor would ensure that they are interchangeable and have the same token contract. This makes it possible to create markets for these tokens across different DeFi protocols. Users can provide liquidity to these markets to earn from LP fees in addition to the interest generated on them. They can also be traded, transferred across wallet addresses and used as collateral for borrowing or leveraging assets. In specific instances, adding support for a particular application would require the approval of the governance committee of that application and the proposals for such partnerships would be undertaken based on the demand of the community. Eventually, when the protocol moves to decentralised governance through its DAO, this would become a function of the governance committee.

2.1.5 Reclaiming Assets

The real enforcement of the price protection mechanism happens at the time of withdrawal when the user burns their crTOKENs and receives either their staked tokens or USDC depending upon the market price of the token at the time of withdrawal. When a user tries to withdraw at a market price that is below the price floor, they get USDC worth the value of the price floor. If the withdrawal happens at a price above the price floor, the user simply receives their staked asset. For example, if a user stakes WBTC at price of \$57,000 and the market starts rising till it reaches \$60,000 before reversing the trend, the price floor gets locked in at 85% of \$60,000, or \$51,000. If the user happens to withdraw their stake when WBTC trades at \$55,000, they reclaim their original WBTC which now has a price of \$55,000. However, if they initiate a withdrawal at \$50,000, they get 51,000 USDC instead of WBTC. This ensures that the maximum amount of losses taken by the users on their holdings never exceeds the price floor at the time of withdrawal. A dynamic price floor means that the maximum losses sustained are always reconfigured to adjust to the latest price movements. At the time of withdrawal, the accumulated interest earnings are reclaimed along with the original staked balance. This would effectively mean that a user's exit position will always be more favourable and profitable than the rest of the market.

2.2 Stablecoin Pool

The protocol maintains a reserve of USDC for providing price protection. Liquidity providers can stake their USDC to receive CRUIZE multipliers as staking rewards. This means that liquidity providers get CRUIZE tokens worth more than their staked USDC value. These CRUIZE tokens can then be staked in the CRUIZE pool to enable compounding earnings on the staked balance. This incentivisation mechanism ensures that USDC staked in the protocol becomes protocol owned liquidity and can be used to provide protection. Instead of unstaking their balance, liquidity providers can also easily trade their CRUIZE tokens with USDC in the market.

The protocol uses a portion of the USDC reserve to generate lending yield on the balance. In the beginning, this portion will be 60%, meaning that 60% of the USDC balance in the reserve will be routed to lending pools to generate yield. The rest 40% will be kept for events of withdrawals that happen when markets are below the price floors. This segregation of capital utility and preservation is used so that transaction and gas costs can be minimised. Routing the whole balance to lending pools would increase the transaction overhead every time a withdrawal is triggered. The balance would have

to be unstaked from the lending pool and this would increase the transaction and gas costs associated with every redemption.

The generated interest is distributed thus:

- 60% is used to provide USDC liquidity to the Smart Treasury to trigger CRUIZE buybacks
- 30% is sent back to the USDC reserve
- 10% is sent to the DAO reserve

In order to maintain sufficient USDC balance to cover asset withdrawals, the protocol uses a shortfall mitigation module that is designed to prevent dry reserves leading to incapacities in claiming assets. This module ensures that there is always enough USDC available when a user tries to redeem their asset below the price floor.

2.3 CRUIZE Token

CRUIZE is the native token of the protocol that will be used in both its incentivisation mechanisms as well as its governance once the move to decentralisation begins. The protocol also has a staking pool to stake CRUIZE and earn a portion of the newly minted CRUIZE that is distributed pro-rata to CRUIZE stakers at every epoch. CRUIZE stakers will receive sCRUIZE that is redeemable 1:1 for CRUIZE. The users' sCRUIZE balance rebases at the end of every epoch based on the minted CRUIZE. The minting schedule of CRUIZE is as follows:

1. **Every time USDC is staked** - A variable percent of the staked USDC balance is minted and distributed to liquidity providers as CRUIZE multipliers whenever they stake USDC to the contract. The multiplier will be greater the more the reserve is in deficit (lesser than the aggregate hedged asset balance) and lesser the more the reserve is in excess (greater than the aggregate hedged asset balance)
2. **Every 6 hours** - A variable percent of the total staked CRUIZE balance will be minted in epochs of 6 hours and 90% of it is added to the pool to auto compound CRUIZE rewards to CRUIZE stakers. The sCRUIZE balance of every staker will keep rebasing on a pro rata basis at the end of every epoch. The emission rate depends on the staked CRUIZE balance and is configured dynamically to incentivise the desired staking behaviour based on the liquidity of the pool. CRUIZE tokens from the pool have further use in the smart treasury for which the right amount of liquidity will be needed to be maintained.

This minted CRUIZE is distributed thus:

- 90% to sCRUIZE holders
- 10% to the DAO reserve

3 Protocol Modules

3.1 Smart Treasury

The smart treasury is a specially configured, protocol owned Balancer smart pool that serves as an automatic buyback machine, token issuance pool, and liquidity provider. The treasury uses an

automated market maker to enable the economic benefits of buybacks and issuance without the drawbacks of burning and without perpetually increasing token supply. This makes it possible to use the treasury as a module to replace a token burning schedule as it runs the risk of decapitalizing the system by over-concentrating ownership at the expense of liquidity and long-term value. The main purpose of the smart treasury is to maintain a protocol owned reserve of CRUIZE and USDC that is encoded with the functionality needed to handle buybacks, token distribution and shortfall mitigation.

The treasury will have an index of 80/20 for CRUIZE/USDC such that there will always be 80% CRUIZE and 20% USDC in the treasury. The pool will be configured to make it protocol owned such that only the protocol can add and remove liquidity from the pool. The smart pool functionality of Balancer makes this pool rebalance to the set index of 80/20 every time there is a transaction on the pool. This happens by automatically transacting with the open market to produce the desired rebalancing effect on the pool. The smart treasury is configured for the following functionality:

3.1.1 CRUIZE Buyback

Of the yield generated on the staked USDC reserve, 60% is deposited to the smart treasury as USDC, increasing the weight of USDC in the pool above 20%. The smart pool functionality ensures that whenever the value of USDC in the treasury exceeds the 20% index, the pool will automatically regain balance by using the excess USDC to buy CRUIZE from the open market until the 80/20 index is restored. If there are no sellers, the pool responds with a higher CRUIZE price. This opens up an arbitrage opportunity against the price difference which is used by arbitrageurs in the Balancer network to stabilise the price difference across the market. Because the pool is network owned, this process effectively becomes a buyback process while having the same positive effect on price. As income from yield generation flows into the network and moves to the smart treasury, buybacks are triggered in real-time and are automatically managed by the smart treasury.

3.1.2 Rewards Distribution

The smart treasury is also used to incentivise LP token stakers as well as provide additional rewards to crTOKEN holders in addition to the yield generated on hedged assets. A variable percent of the CRUIZE balance in the smart treasury is distributed as rewards to LP token stakers and crTOKEN holders every 8 hours. The rate of rewards distribution depends on various factors and is computed as the aggregate rate of rewards that need to be distributed to LP tokens stakers and crTOKEN holders. For LP token stakers, the main factor includes the proportion of the liquidity of open CRUIZE markets that is staked as LP tokens in the protocol, while for crTOKEN holders, the main factor includes the weighted average APY of the total staked balance. CRUIZE rewards are distributed proportionately based on these factors and the rates are functions of the underlying factors that are computed mathematically to distribute rewards at every epoch. It is to be noted that every time CRUIZE is withdrawn from the smart treasury to distribute rewards, the 80/20 index is shifted and the pool will automatically rebalance by using the excess USDC to buy CRUIZE from the open market. Therefore, the distribution of rewards triggers a buyback event that has a positive effect on the price of CRUIZE.

3.2 Shortfall Mitigation Module

The Shortfall Mitigation (SM) module is designed to handle instances when the balance of the USDC reserve falls below a safe limit needed for providing price protection. The SM module uses USDC

from the DAO reserve to cover any deficits. However, in the unlikely event that the DAO reserve is depleted too, the SM module sources USDC from the smart treasury instead. There are 2 thresholds that are configured to handle a shortfall event. The first is used to ensure that there is enough USDC present in the SM module to cover crTOKEN redemptions. The second is used to execute timely refills to avoid delays that are caused while replenishing a completely depleted reserve. To prevent the USDC reserve from continuously using up USDC from the DAO reserve or the smart treasury, leading to rapid depletion, this two-tiered shortfall mitigation functionality creates separate tranches of USDC for storage and final utilisation. Any redundant withdrawals of USDC can be redirected back to the smart treasury which triggers a CRUIZE buyback event and also counters the effects of sell action that is triggered on the CRUIZE in the smart treasury every time USDC is withdrawn from it.

The first threshold is equal to 25% of the aggregate crTOKEN balance which is the total USDC value of all the circulating crTOKENs issued by the protocol. The SM module tracks the total balance of the USDC reserve and the aggregate crTOKEN balance every 2 hours and confirms whether the balance is above the first threshold. In the event that the first threshold is breached, the SM module is filled up with USDC taken from the DAO reserve in a proportion that brings the total balance up to the first threshold. For example, if the balance of the USDC reserve falls to 15% of the aggregate crTOKEN balance, the SM module is filled up with the rest 10% with USDC sourced from the DAO reserve.

The second threshold is used to finally send the USDC accumulated in the SM module to the USDC reserve and is needed so that USDC isn't directly exhausted from the DAO reserve every time the first threshold is breached. This second threshold is equal to 10% of the aggregate crTOKEN balance. When the balance of the USDC reserve falls below this limit, the SM module is filled up with USDC to bring the total balance up to the first threshold, or 25% of the aggregate crTOKEN balance, and the entire amount from the module is sent to the USDC reserve. If the balance of the USDC reserve is restored to reach the first threshold before the second threshold is breached, the USDC from the SM module is sent to the smart treasury which triggers a buyback event to account for the new, imbalanced proportion of USDC. For example, if after 2 hours from the previous scenario where the USDC reserve balance had fallen to 15% of the aggregate crTOKEN balance and the SM module was filled up with the rest 10% from the DAO reserve, the balance falls further to 5% of the aggregate crTOKEN balance, which is below the second threshold, the SM module is filled up so it has the rest 20% stored in it, and this entire amount is redirected to the USDC reserve to keep the balance above the first threshold. If however, the balance of the USDC reserve recovers to over 25% of the aggregate crTOKEN balance after 2 hours, the USDC accumulated in the SM module is sent to the smart treasury instead. Therefore, the first threshold is used to trigger a refill event for timely utilisation which can be reversed if the second one isn't met.

3.3 Liquidity Provision

Every week, a variable percent of the DAO reserves are used to provide liquidity to all the open markets. Other than providing a backstop for any shortfall events that might happen across the protocol, the DAO reserves are also used to supply liquidity to high volume CRUIZE trading pools. This rate keeps changing depending upon the proportion of the DAO reserve needed for shortfall mitigation and will account for any excess balance that can be used to provide liquidity to CRUIZE trading pools. The liquidity will be provided to the following Sushiswap markets -

- CRUIZE/USDC

- CRUIZE/ETH

The LP tokens received after providing liquidity are staked in the protocol contract and are used to increase the proportion of protocol owned liquidity. A higher proportion would ensure more stable liquidity for CRUIZE trading pools.

4 Incentivisation Mechanisms

4.1 USDC Liquidity

USDC stakers get CRUIZE multipliers worth more than their staked balance. The multiplier function will primarily depend on the difference between the USDC reserve balance and the aggregate crTOKEN balance. This variable rate is used to incentivise the desired liquidity provision outcome such that it decreases when the USDC reserve balance is in excess of the aggregate crTOKEN balance and it increases when the USDC reserve balance is in deficit. It is to be noted that the multiplier rate can even fall to a negative value if the surplus USDC reserve balance increases, meaning liquidity providers get CRUIZE worth less than their staked balance. Stakers looking to reacquire USDC can easily do so by swapping their CRUIZE for USDC in the open markets.

4.2 CRUIZE Staking

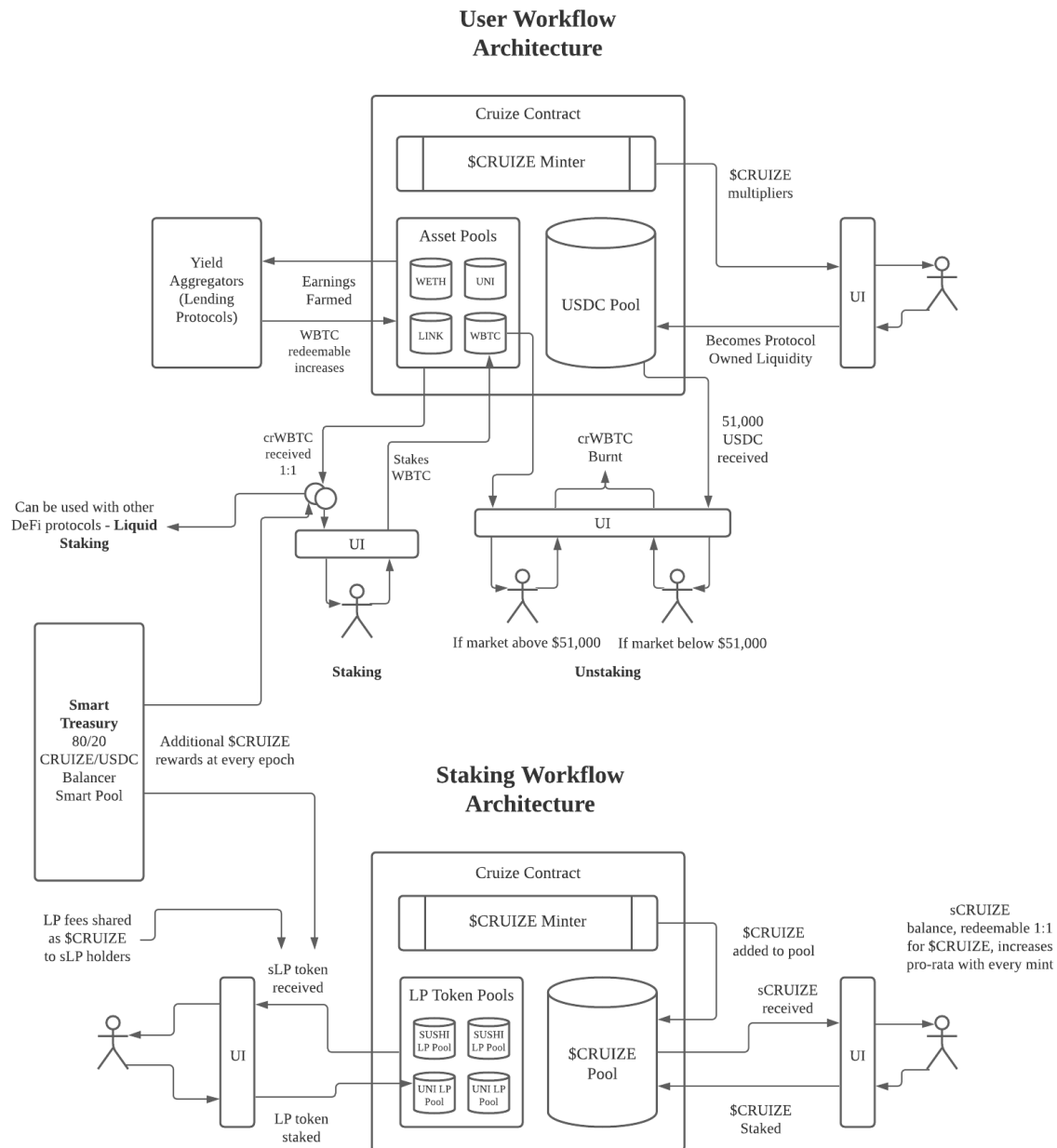
Holders can stake their CRUIZE in the protocol to earn CRUIZE rewards passively that auto-compound after every epoch of 6 hours. CRUIZE stakers receive sCRUIZE that can be redeemed 1:1 for CRUIZE at any time. The sCRUIZE balance associated with every wallet rebases after every epoch and cannot directly be transferred between accounts. The balance can be wrapped to create wsCRUIZE tokens that are transferable. These wsCRUIZE tokens do not automatically rebase after every epoch but accumulate the underlying CRUIZE rewards which can be claimed after wsCRUIZE tokens are unwrapped.

4.3 LP Staking

LP tokens can be staked in the protocol to receive sLP tokens that can be burned to reclaim the original LP tokens along with the rewards accumulated on them. Holders of sLP tokens receive the fees generated from the open markets they provide liquidity to in the form of CRUIZE in addition to a variable rate of CRUIZE rewards distributed from the smart treasury every 8 hours. Fees generated from the following Sushiswap markets are swapped for CRUIZE and distributed pro-rata to sLP token holders -

- CRUIZE/USDC
- CRUIZE/ETH

5 Protocol Architecture



6 Protocol Fees

Hedging Fees	2% at the time of withdrawal
Yield Generation	10% of the yield generated on the USDC reserve

6.1 Hedging Fees

2% fee charged at the time of reclaiming hedged assets, sent to the DAO reserve.

6.2 Yield Generation

10% of the yield generated on the USDC reserve sent to the DAO reserve

7 Potential Risks & Mitigation

7.1 Oracle Pricing

The price oracle can be designed to use price feeds from a trusted source such as Chainlink which uses DEXes as one of the price data sources and aggregates data using several layers such as exchange price data, node operators and oracle networks. Cruize primarily uses the Chainlink oracle price feeds which will update the token price feeds at the end of every block. To mitigate oracle risk, such as in cases if the Chainlink oracle does not return an expected result or the latest price feed deviates more than 2% from the last available price, the feed will be tallied with a backup oracle provided via Band Protocol.

7.2 Technical Risks

The technical risks associated with the smart contracts could include design flaws, implementation bugs and cyber attacks. The deployed contracts may be susceptible to security breaches for which robust testing will be needed before any new contract is deployed to the mainnet. After the move to decentralisation and the formation of a governance module is complete, the network will need a strong governance model and efficient control processes to deploy new or amend existing smart contracts. The protocol will also need a robust incident management process to identify and respond to glitches in smart contracts on time.

8 Conclusion

The potential for censorship-resistant tokenized asset hedging is still largely untapped. Primitive alternatives such as trading orders that execute trades at predetermined prices are present only sporadically across platforms and lack a structured approach to value optimisation that combines price protection with earnings and savings. Further improvements to the protocol as well as functional upgrades and new features will vastly increase the utility of the platform. An eventual movement to decentralised governance will also reduce systemic risk and increase the long term viability of the project.

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