SynFutures - Open and Trustless Derivatives Market

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Abstract

This paper introduces an open and decentralized derivatives platform that allows a variety of assets, including Ethereum native, cross-chain and off-chain real world assets to be synthesized and freely traded. In the first version of the contract, SynFutures will launch a digital asset futures market to introduce (1) futures contract of arbitrary assets and expiration dates to be created by liquidity providers (2) Synthetic Automated Market Maker (sAMM), for market participants to provide one single digital asset of a trading pair only and the smart contract to synthesize the other (3) Automated Liquidator (ALQ), which reduces the entry barrier of liquidators and helps automate the liquidation process.

Keywords: Derivatives Market, Synthetic Automated Market Maker, Automated Liquidator

1 Introduction

Decentralized finance has enjoyed its summer in 2020. More importantly, it has proved the feasibility of building open financial services based on blockchain and transcending their centralized institutional peers in terms of transaction volume and pricing offerings. When SynFutures launches, the latest frenzy of liquidity mining has slowly faded, but the decentralized finance movement just starts.

When picturing the next generation decentralized financial platform, two basic principles have always been kept in mind: (1) It must reflect the fundamental advantages of blockchain over traditional financial systems (2) It must serve customer demand well and have a good market potential.

1.1 Advantages of Blockchain in Finance

Performance and scalability has increasingly become the bottlenecks of Ethereum, and will be difficult in the foreseeable future for blockchain to catch up with centralized systems – Democracy normally lags behind centralized power in terms of decision making and execution efficiency. To build a financial system based on blockchain, what to be exerted should be its competitive advantages, whose implications in finance are elaborated as below:

First of all, friendly regulation - in the short-term though. Consultation papers of digital asset regulations in various jurisdictions have clearly indicated that it is the case simply because today' s digital asset market is relatively small in scale, not yet impacting the overall financial stability. With the popularization of digital assets, regulations will only become stricter.

Secondly, the smart open finance path chosen. It is a "choice" because open and programmable finance can also be found in traditional centralized financial institutions. Most of them set up service barriers deliberately to protect their vested interest only, and hindered by the legacy system that could also be replaced. However, it does offer the emerging blockchain financial industry the possibility of overtaking their giant traditional peers .

Lastly, blockchain' s fundamental advantage, or its "trustless" property. In fact, many nowadays monopoly financial services can be broken down into (a) manual intervention, (b) automated operation plus (c) liquidity provision. The trustless nature of the blockchain would allow various services originally combined in one role to be split up and partially handed over to smart contracts for implementation. As a manifestation, Automated Market Maker (AMM) projects built by teams of 2-5 developers have recently earned the trust of billion-dollar worth of locked assets , whose "receipt", or LP token issuance, asset custody and settlement are performed by the transparent smart contracts. In addition, the though-not-perfect models greatly reduce the entry barriers of market making, assuring liquidity providers that their profit and loss will be handled by the set of codes instead of being arbitrarily determined by centralized parties, and thus enable a more effective usage of idle liquidity across the entire network.

1.2 Derivatives Market Landscape

In traditional finance, the market size of derivatives has long outstripped that of spot. According to Bank for International Settlements, in 2019, FX spot transactions accounted for 30.13% of the total trading

volume, Futures (including forwards and swaps) transactions accounted for 65.36%, and Options 4.51%. Futures market size amounted to 217% of the spot market.

In the centralized digital currency trading world, as the market matures, derivatives trading volume has also been enjoying exponential growth. According to CryptoCompare, spot trading volume of cryptocurrencies in 2019 was US$13 trillion, and derivatives accounted for nearly 23% of the spot market at US$3 trillion. After only half a year of development, the percentage has increased to about 37% by June 2020. However, the derivative products of centralized exchanges today generally face the criticism and skepticism of users, especially for its "blackbox" of liquidation operations.

Turning to decentralized digital exchanges, however, the derivatives market is negligible compared to the spot with very few service providers. Coupled with its openness and transparency, we see huge market potential ahead.

1.3 Vision and Principles

SynFutures aims to build a next-generation digital asset derivative trading and clearing platform, adhering to the following product design principles:

1. It should be an open and free market, offering market participants the power to add and trade any assets on the platform. The market, instead of the platform operator, will decide who are the winning assets. Of course, as the guidance for investor protection becomes clearer, we will work to further improve the fair market rules together with the community.

2. It should maximize the variety of tradable assets on the blockchain, from Ethereum native, cross-chain digital assets, to the real-world assets.

3. It should reflect the fundamental advantage of blockchain, i.e. trustlessness, to realize financial inclusiveness. The "inclusiveness" in this project focuses not on the users, but on the other role of a platform, i.e. financial service providers. We will strive to gain the confidence of the network' s idle liquidity by solid smart and open smart contracts, and continue to improve our models to lower the entry barrier of the originally professional-only financial service providers, including market makers, liquidators etc.. By further decomposing these roles into basic modules and opening up the automated and liquidity provision related parts, more people can participate in the financial system , enjoy the return of their liquidity, while at the same time maximize the utilization of resources across the network and reduce systemic risks.

2 Architecture

The first version of the contracts starts with a Futures market, introducing (1) Arbitrary asset and expiration date as determined by liquidity providers, (2) Synthetic automated market maker (sAMM) and (3) Automated liquidator (ALQ). Refer to Figure 1 for an illustration of the overall architecture.

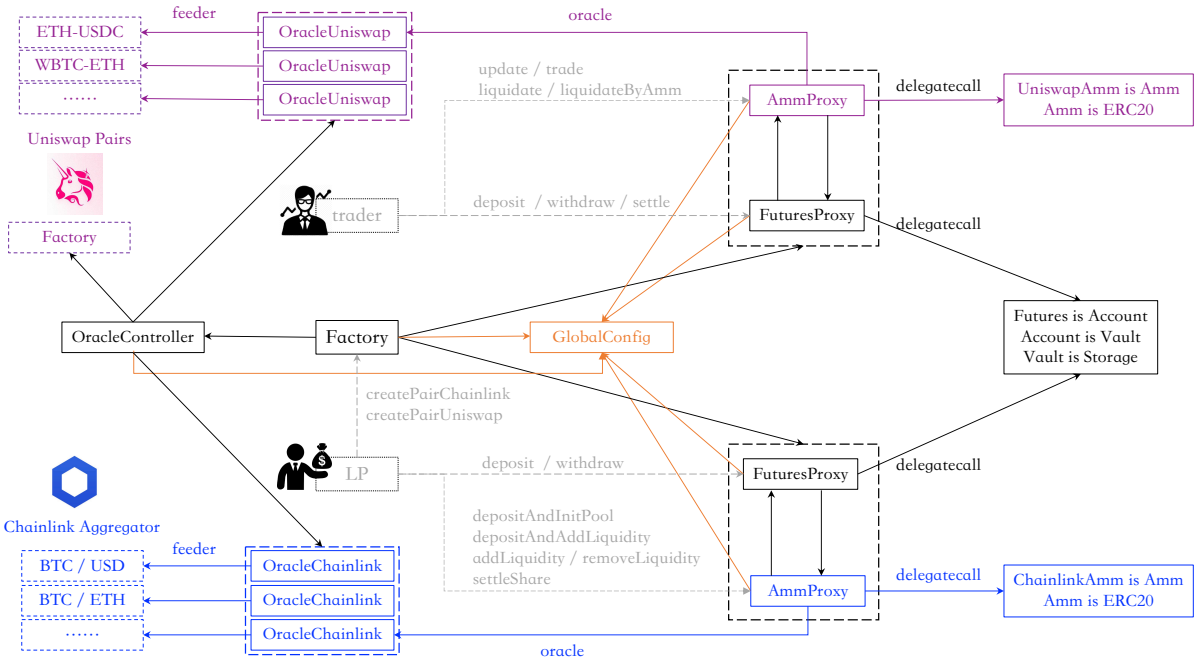

Figure 1: Architecture of SynFutures

2.1 Futures Contract

Formally, all of the futures contracts are defined as linear non-deliverable contracts with 10% initial margin and 5% maintenance margin. The definition of a unique market consists of a Spot Index Oracle for a trading pair and Maturity of this contract. For the trading pair of the Spot Index Oracle can be further split into BASE and QUOTE assets, where the QUOTE asset should be an ERC20 token used as the margin for this Futures Contract and the BASE asset has no restriction as long as such oracle is available.

2.2 Synthetic AMM

Built on the idea from current constant product AMM for spot trading, Synthetic AMM is designed to provide similar trading experience for futures margin trading. In essence, the sAMM is a market participant with its own margin account similar to other users, but always ready to make prices based on the constant product formula and its current position. Apart from trading, the sAMM contract provides users with interfaces to add and remove liquidity to the sAMM liquidity pool and the sAMM contract also acts as the gateway for users to deposit margin to and withdraw margin from their account.

Liquidity Pool: To add liquidity to the sAMM, a user interacts with the smart contract and transfers the margin token, or the QUOTE asset to the sAMM. Internally the sAMM creates a long position in the Futures Contract using half of the added margin token, effectively synthesizing the BASE asset of a trading pair, and keeps the remaining half as available margin. At the same time, the sAMM would allocate a short position of the same size as the newly created long position to the same user. As a liquidity provider, the user owns a share of the total long position and the available margin of the liquidity pool

in the sAMM. The total risk position of a liquidity provider equals the share of the long position of the sAMM plus the position in their own account. Thus the action of adding liquidity to the sAMM does not change the total risk of the liquidity provider as the newly created long and short positions offset each other. However, the liquidity provider does need to ensure sufficient margin in their margin account to meet the margin requirement after adding liquidity to the sAMM. Removing liquidity from the sAMM follows a similar but reverse process where the sAMM would reduce its long position and allocate the reduced long position to the user requesting to remove liquidity and return the margin token to the user. Similarly, the action of removing liquidity from the sAMM does not change the total risk of the liquidity provider.

2.3 Liquidation

When the margin balance of an account is lower than its maintenance margin requirement, the account needs to be liquidated. Two approaches for liquidation are provided.

Conventional DeFi Approach: Liquidator takes over the position of the liquidated account and provides the required initial margin at current Mark Price. After successful liquidation, the liquidator will receive the balance of the maintenance margin of the liquidated account as reward. This approach has no market impact as the only change to the system as a whole is the extra margin provided by the liquidator. However, a liquidator willing to provide such margin and take over a risky position might not always be available. Thus full liquidation is desired when such a liquidator appears.

Automated Liquidator (ALQ) Approach: In both traditional financial market and CeFi exchanges, liquidations are normally handled by executing trades in the market to partially reverse the position of an account failing below its maintenance margin requirement. The difficulty of this partial liquidation approach in DeFi is the availability of a counterparty, before the invention of AMM. With the AMM, accounts that need to be liquidated can be forced to trade with the ALQ, or in this version at the same time the respective AMM to partially reduce their positions to meet margin requirements. In this approach, liquidation would have some market impact, similar to traditional financial market and CeFi exchanges. Compared to the conventional approach, this approach hugely reduces the entry barrier for liquidation as it only requires an initiator to send a transaction to the smart contract, without providing any margin or taking any risky positions. The successful initiator will be rewarded by the ecosystem.

2.4 Mark Basis and Price

Similar to the traditional financial markets, convergence of futures price to spot index is only guaranteed at the maturity for settlement. Prior to that, futures price follows its own price discovery of the market, although a high correlation is expected with spot price. Thus, the difference or basis between Futures price and Spot Index is an important factor in determining the fair price or Mark Price of Futures.

For risk management purposes, a near real time mark price with a stable basis is desirable. The Mark Price for a Futures Contract is defined as Spot Index + Mark Basis, where the Spot Index provides the near realtimeness while the Mark Basis keeps the relationship between futures price and spot index stable

by applying exponential moving average on past basis.

Before the last hour of a Futures Contract, Mark Price is defined as below:

$$\text{Basis}_T = \text{FuturesPrice}_T - \text{SpotIndex}_T$$

$$\text{MarkBasis}_T = \alpha \cdot \text{Basis}_T + (1-\alpha) \cdot \text{MarkBasis}_{T-1},\ \alpha = 1 - e^{-\Delta T/\tau}$$

$$\text{MarkPrice}_T = \text{SpotIndex}_T + \text{MarkBasis}_T$$

In the last hour of a Futures Contract, basis is assumed to be 0 and the Mark Price will be the TWAP of Spot Index to facilitate the price convergence to the spot and the eventual settlement.

Whenever the state of the system changes, the Mark Price is updated. The system also allows voluntary mark price updates without trading or liquidity changes and the initiator of such updates will be updated by the ecosystem.

2.5 Settlement

In the last hour before maturity, the AMM enters the settling mode. In this mode, users are only allowed to reduce position and not allowed to open or increase position. This is to ensure a smooth settlement of the futures contract. The final settlement price will be the TWAP of the Spot Index during the settling period. In addition, Mark Price used for liquidation in the settling period will also be the TWAP of the Spot Index to be consistent and avoid the situation where some accounts need to be liquidated after settlement. After the maturity, users will be able to settle their position into margin and withdraw their margin balance from the AMM

3 Governance

4 Road Map

- Nov 2020: Testnet and contract audit for v1 fixed margin futures
- Dec 2020: Mainnet launch of v1
- Feb 2021: Testnet and contract audit for v2 cross margin futures
- Mar 2021: Mainnet launch of v2 and governance
- Jun 2021: Futures basis trading
- Sep 2021: Option trading
- Dec 2021: Portfolio margin