MetaMon
Token Whitepaper

1 Introduction

In this paper, we present a protocol for creating a decentralized price-reactive cryptocurrency. The protocol uses a mechanism through which its inflation rate can be adjusted based on market demand. When the value of the protocol's native token appreciates relative to larger currencies, holders receive tokens as rewards which inflate the supply. This is important, because it ensures that when demand is high, there will be an amount of supply available to meet that demand. On days that the protocol's native token depreciates, no inflation occurs. We also introduce a burning mechanic, whereby every transfer takes a fee that is subtracted from the amount transferred and removed from the supply. This creates a deflationary pressure on days that the token price does not increase in value. In addition, the protocol aims to introduce a novel incentive structure that promotes holding the token and providing liquidity on exchanges. The protocol is called the MetaMon Token (MetaMon).

Figure 1: The MetaMon Token logo

2 Price-Reactivity

We define the term "Price-Reactivity" as the capability for a currency to adjust its circulating supply relative to its market price. The protocol defined in this paper, called the MetaMon Token, is a price-reactive cryptocurrency. Price- reactivity is an important feature because it creates adequate supply to react to demand spikes as the result of large amounts of liquidity entering or exiting the system. This should lower volatility in the short-term, which allows for the currency to act as a store-of-value in the long term.

The protocol is implemented on the BEP20 Chain (BSC), which prevents the sup- ply adjustment from being dynamic. Instead, every 24 hours the price change in percentage form is stored in the state of the smart contract, and holders interact with the contract to update their supply relative to the price change. Holders have an incentive to perform the interaction, because if they do not their share of the supply will be diluted. On days that the price does not increase, no re- wards are available to be claimed, which limits inflation to days that the network receives an increase in demand. In addition, all sells and transfers are subject to burn fees that increase in times of lower demand. This introduces a deflationary pressure on the network, which reduces the impact that the inflation has. The aim is to keep the inflation and deflation rates close, but we concede that the currency will be slightly inflationary, because we provide incentives for holding for long periods of time. These incentives are discussed in the section below.

3 Incentive Structure

While price-reactivity is a principal feature of the protocol, one cannot ignore the importance of a balanced incentive structure when designing a decentralized cryptocurrency system. The Pamp Network incentive structure ties itself into the price-reactivity by increasing the supply adjustments for long-term holders, thereby reducing token velocity. That is, the longer a given token holder holds, the greater their rewards are on price-positive days. Note that the terms 'supply adjustment' and 'reward' are interchangeable as they both refer to the protocol's ability to increase its supply. In addition, we call holding the token for long periods of time 'staking.'

$$tokens = balance * \frac{numerator\ of\ percent\ change * days\ staked}{denominator\ of\ percent\ change * inflation\ adjustment\ factor}$$

Figure 2: Rewards formula

The above formula is used to calculate the owed supply adjustment for a given holder on a given day. Notice that the 'days staked' variable acts as a positive multiplier on the user's daily owed rewards. The 'days staked' multiplier begins immediately when the buyer receives tokens in a new address and is reset when any amount of tokens are moved from that address, but does not change when rewards are claimed (which allows for compound interest). It is manifested in the smart contract as a Unix timestamp taken from the block in which the original transaction occurred. This multiplier gives a strong incentive for users for buy and hold, temporarily removing tokens from the total supply until demand spikes again and holders might choose to forgo future rewards to lower the volatility. The intention with this incentive is to lower token velocity and thereby increase the intrinsic value of the network [1].

The inflation adjustment factor is a variable that allows the team behind the development of the implementation to adjust the inflation rate if it gets out of hand. This is initially necessary because projecting the actual inflation rate is difficult without knowing the price action in advance. If the token increases in value rapidly, the inflation rate might quickly spin out of control; thus, the inflation adjustment factor introduces a mechanism to limit inflation. The current inflation adjustment factor is set to 600. This appears to be a good number, and in future releases the number will become static so as not to introduce centralization or subjectivity into the protocol.

Now, suppose an individual purchases 10 PAMP tokens and holds them for 30 days. He then increases his balance to 12 PAMP. Certainly, he has not been holding 12 tokens for 30 days - he has only been holding 10 of them for 30 days. This is an issue that is solved by decreasing a user's staking time when they receive tokens based on the number of tokens received as a percentage of the user's total balance.

$$seconds = 1000000 * \frac{amount\ received}{current\ balance}$$

Figure 3: Staking time reduction formula

This allows users to receive new tokens while still maintaining their days staked multiplier, without allowing abuse of the rewards structure. Using the above formula, if a user receives 9% of their current balance, their 'staking time' is reduced by 90,000 seconds, or 25 hours, and 5% is about 13 hours. In the next release of the staking contract, this penalty will be reduced by half. If a user wishes to accumulate tokens over a period of time and still participate in the rewards, it is evidently wise to have multiple wallets - at least three is recommended.

Another incentive to hold tokens for long periods of time is Holder's Day, which is one day each month that holders of 30 days or more in staking time receive a bump in rewards regardless of price action for the day.

$$tokens = current\ balance * \frac{days\ staked}{600}$$

Figure 4: Holder's Day reward formula

According to the formula, on this day a holder of 30 days receives a 5% reward and a holder of 60 days receives a 10% reward. This creates an incentive for long-term holders to continue staking even if the price is negative for an extended period of time. Note that it is not possible to have a reward of greater than 10% on any given day.

Volume across exchanges is important for a healthy project. Generally, when the price of a coin or stock increases with low volume, the price action is not considered very bullish. To ensure that an increase in price is indeed due to an increase in demand and not due to low liquidity or high spread, our smart contract imposes some volume requirements for rewards. This requirement uses a market-cap-to-volume ratio.

$$ratio = \frac{market\ cap}{volume}$$

Figure 5: Market cap to volume ratio

In smart contract-land, there is no way to properly measure the 'circulating supply' and the 'total supply' — there is just the total token supply. To account for this, we have decreased the volume requirement with respect to market cap for the market cap calculated using the total token supply. In order for streaks to count, the daily volume must be at least 4% of the market cap, when calculating using total supply, or 10% of the market cap, when calculating using circulating supply. Normally a streak decreases the inflation adjustment factor by a factor of the number of days in the streak, but if the volume is less than 4% or 10%, respectively, the streak does not count. In addition, if the volume is less than 2% of the market cap when using total supply or 5% when using circulating supply, the inflation adjustment factor is increased by a factor of ten, dramatically reducing rewards.

4 Liquidity Staking

While allowing the token supply to adjust relative to market demand is good for volatility, it is arguably useless without market liquidity. Because the protocol implementation restrictions require a smart contract interaction to adjust each holder's respective balance, there is no incentive to keep liquidity locked in an exchange due to dilution. We counteract this misaligned incentive by rewarding users who provide Uniswap exchange liquidity, and we do this via liquidity tokens. Mdex liquidity tokens are Heco-compliant tokens that represent a share in the Mdex liquidity pool for a given Mdex asset pair (in our case, this is the Heco-MetaMon pair). Liquidity tokens are minted when liquidity is provided and burned when liquidity is removed. Thus, the percentage of a user's liquidity tokens relative to the total supply of liquidity tokens is equivalent to the percentage of the user's balance in the pool relative to the total balance in the pool. This is applicable to both assets, which in this case is BNB and MetaMon Token (MetaMon).

$$\text{total token ownd} = (\text{days starked} * \text{reward adjustNent factor}) * \frac{\text{Mdex balance}}{\text{Mdex total supply}}$$

Figure 6: Liquidity staking rewards formula

The above formula is used to calculate the owed rewards in MetaMon tokens for a given balance of liquidity tokens and amount of days those tokens were staked. Note that claiming liquidity staking rewards will reset the amount of days the liquidity tokens were staked, which in turn means that the rewards from liquidity staking are not meant to be claimed daily. The user can choose to claim their reward and withdraw their liquidity tokens whenever they would like. It is recommended to enforce a minimum stake duration so that liquidity is not being removed and added frequently as consistency in the amount of liq- uidity on the exchange is important. The implementation requires a minimum of 2 days before liquidity and rewards can be removed and claimed, respectively. The total supply is not a constant figure, so similarly to price-reactive staking, it is difficult to predict future liquidity staking rewards.

The reward adjustment factor allows for the control of the amount of rewards that are available to liquidity stakers. This is another mechanism to control inflation on the network, and will be removed in a future release. The current reward adjustment factor for liquidity staking is $5 * 10^{21}$.

5 Price Oracle

Decentralized systems often require access to external data. This protocol, for instance, requires access to accurate market data so it can adjust its inflation rate accordingly. Ethereum does not have a built-in mechanism by which data can be retrieved, so in order to update market data, an external function call must be used that supplies the contract with the relevant data. The first implementation uses an external script that queries cryptocurrency tracking website CoinGecko several times per day, and then averages the price and percent change to come to a proper conclusion of the price action throughout the day. The script then pushes the averaged market data to the smart contract only if the price is positive (to save on gas fees).

In a future release, the implementation should use a decentralized external data source (Oracle) that publishes the price movements. A decentralized oracle is necessary because it removes the trust placed on the development team to record and publish the price properly. Ideally, this Oracle will average the price movements throughout the day using price history and only publish if the average percent change is positive - but this might not all be possible. The implementation plans to use the Chainlink network as the price oracle because its threshold signature approach makes it sufficiently decentralized for our use case [2]. In addition, the Chainlink network aims to be blockchain agnostic [3], meaning we can continue using it in future implementations on different blockchains (explained further below).

6 Future Work

Building our protocol on Heco allows us to make use of the myriad of other decentralized finance applications that exist in the Heco ecosystem, such as decentralized exchanges like Mdex[4] and loaning protocols like Compound [5]. The MetaMon Token protocol can be used as a financial instrument and a hedge during a market downturn (due to the deflationary burning mechanic), which makes it a good candidate for lending platforms.

Heco is also quite limited in terms of throughput, meaning that in its cur- rent form it cannot meet the sheer scale necessary to run financial applications for the entire world. This means that our protocol ought to be blockchain-agnostic, so that it can easily be ported to other blockchains that have less throughput limitations. We identify the Polkadot network as a good contender for the next implementation of the protocol as it allows for cross-chain interoperability, so staking can be done on many different chains which allows for greater usability. Polkadot also offers exceptionally higher throughput and provable finality via the GRANDPA consensus mechanism [6], which is incredibly useful as it allows the MetaMon Token protocol to adjust itself much quicker than it can on Ethereum. With Polkadot, it's possible that supply adjustments could take place every hour, for example, and individual stakers would not haveto perform any contract interaction for their balances to update - in fact, they would not even have to be staking on the same chain.

7 Conclusion

In this paper we presented the MetaMon Token, a protocol for a price-reactive cryptocurrency. The protocol uses a price oracle to retrieve market data which allows it to adjust its inflation rate accordingly. The protocol's ability to in- crease its supply allows it to better respond to changes in market demand than many other cryptocurrencies. In addition, the protocol uses a novel incentive structure to incentivize certain behaviors that decrease token velocity which improves network value. We also introduced a mechanism by which Uniswap liquidity tokens can be staked in order to incentivize decentralized exchange liquidity pooling. Finally, we discussed our plans for future work, including the integration of the decentralized oracle network Chainlink to remove trust in the pricing process, and an implementation atop a high-throughput base chain like the Polkadot network for better granularity in price-reactivity, and better user experience and incentive design. We believe that our protocol will pave the way for future experiments in decentralized price-reactive financial protocols.