Spark Token:
A Deflationary Token on the Tezos Blockchain

Andrew Chang, Anh Nguyen, Oscar Vergara

30 July 2020

Abstract—An experiment testing the public's reaction to a newly created crypto token running on the Tezos Blockchain that would add users to its electronic ledger and allow trading to occur among those registered in the ledger. In order to combat price volatility that negatively affects many cryptocurrencies on the market, a deflationary function is implemented through coding in Michelson, a stack-based and low-level functional programming language, the smart contract on which the token is structured. Every transaction trading the tokens and calling upon the smart contract will destroy two percent of the transferred amount, resulting in a gradual decline in the finite supply of tokens. The value of the token depends on public interest and time.

1 INTRODUCTION

Cryptocurrencies are infamous to be vastly volatile. As of early 2017, Bitcoin broke $1000 price, which spiked almost 2000% to a little less than $20000 by December 18 when it reached its record high. However, in the span of three months by February 2018, Bitcoin price plunged more than 50% down to below $7000; many investors who anticipated further rise in price lost a ton of money. Ever since, Bitcoin has been incredibly volatile, rising and falling by an incredible volume in a day or a week. Unfortunately, this volatility is not exclusive to Bitcoin—it holds true for just about every cryptocurrency on the market. This issue detracts many people away from investing into cryptocurrencies, and it further discourages the steps to widespread adoption of formal crypto usages in place of fiat money.

With Spark Token, we will observe the effects of deflationary tokens on long term price stability. We followed the Bomb Token's model of burning a percentage of transacted amounts, steadily and gradually decreasing the total token supply to achieve our token's deflationary nature. Deployed on the Tezos

platform with an initial supply of one million tokens, Spark will burn 2% of transactions.

2 BACKGROUND

2.1 Bitcoin

Cryptocurrencies run on blockchains, a list data structure connected by hash pointers. Blockchain was originally proposed in the bitcoin whitepaper as a decentralized peer-to-peer method to facilitate digital transactions without third party trust. Instead of relying on a centralized authority to oversee our transactions, bitcoin achieves distributed consensus through the public ledger in a blockchain form. Each transaction, validated through public key encryption, is announced to all nodes in the network, which addresses the double-spending problem by maintaining the full record of transactions. The transactions are regularly grouped into a block by miners and added to the blockchain. When miners create the blocks, they must provide proof-of-work that significant effort was put into the mining process. The miner must discover a nonce, a binary code that begins with a certain number of zeros. As the number of required zeros increases, the probability of discovering the nonce decreases exponentially. To incentivize miners to undergo such an arduous process, miners are granted a block reward upon successful block creation, minting new coins out of nowhere (Nakamoto 2009). A block also contains a timestamp, which creates a unique block hash combined with transactions and the proof-of-work. The next block in the chain points to the previous block's hash. Because bitcoin naturally trusts the longest blockchain and hashes alter even due to the smallest changes, if an attacker was to forge a fraudulent chain and make other nodes trust it, he or she would need to provide proof-of-work repeatedly until the fraudulent chain's length catches up to the length of the current longest blockchain. The probability of successfully performing such an intensive task is miniscule with the amount of time and computing power required; hence, bitcoin is deemed secure.

2.2 Ethereum

Ethereum was proposed as a general platform for building any blockchain applications beyond simple transactions such as smart contracts and smart properties (Buterin 2013). Beginning by describing cryptocurrency ledgers as state transition systems, Ethereum introduces UTXO: Unspent Transaction Outputs. A state is tied to an owner's UTXO and signatures. If UTXO is not

present in the account during transactions or signatures do not match, then a function returns an error. For a block to be valid, each transaction in the block must provide a valid state transition.

The key limitations of the Bitcoin scripting language identified by Ethereum are lack of state, lack of turing-completeness, value-blindness, and blockchain-blindness. In short, the Bitcoin scripting language is unaware of its value in respect to fiat currencies, inaccessible to the identity of previous blocks in the blockchain, and unable to write loops. Ethereum's main objective is to address these problems and create a protocol that can facilitate various decentralized applications. A major concept established by Ethereum is gas, which is the cost to run a transaction. Likewise a vehicle running out of gas, computation aborts when the transaction depletes all gas. This is a rather ingenious way to prevent infinite loops and various brute-force attacking schemes.

Ethereum's clever interpretation of blockchains spiraled the development of decentralized applications and smart contracts. Smart contracts on Ethereum are used to create ERC-20 tokens, a digital asset designed for the Ethereum platform. It is a token standard that defines how Ethereum tokens should behave. The six main functions of ERC-20 tokens are total supply, balance, transfer, transfer from, approve, and allowance functions; they all establish a set of requirements of a token's property and behavior. The ERC-20 standard propagated the creation of thousands of tokens on the current market and inspired future token standards such as ERC-721.

2.3 Tezos

Tezos primarily differentiates itself from other blockchain platforms by implementing a self-amendment process, eliminating the need to fork the network into multiple blockchains and preventing community divisions. In addition, Tezos employs the proof-of-stake method to reach consensus. Proof-of-work has proven to be immensely power and time consuming as the mining power increasingly grew demanding. Proof-of-stake addresses the issue by introducing a democratic method to reach a consensus while incentivizing nodes to be honest by holding them at stakes. Tezos also facilitates formal verification, a technique of mathematically proving smart contracts' correctness. Instead of performing a series of unit tests, formal verification provides a

confirmation for all inputs including edge cases. This can help catch serious flaws in programs.

3 DEFLATIONARY CRYPTOCURRENCY

In economics, inflation is a quantitative measure of the price of a certain goods that increases over a period of time, which leads to the loss of purchasing power. As a result, inflation could negatively impact the cost of living for the common public. "For hard-money advocates, the deflationary property of gold and cryptocurrency form a built-in guarantee for a long-term value." Bitcoin is theoretically positioned to work against inflation and even though Bitcoin's supply is algorithmically limited to 21 million tokens, it still experienced dramatic inflation during the last 10 years (Dalton 2019). Since the emergence of blockchain technology, economists and developers from all over the world have created various cryptocurrencies to tackle this problem.

3.1 Deflationary Coins

3.1.1 *Bomb Token*

We decided to model our token after a project similar to ours. Historically, Bomb Token was the original deflationary token to hit the market with an "asset" that had virtually no value to it, and yet they wanted to experiment what would happen if they were to unload a certain amount of tokens to the public for free. We felt their strategy was the right one to emulate as their objectives corresponded to ours.

Bomb Token commenced as a social experiment to test how the cryptocurrency market would react to the first ever coin that deflates via burning. The rationale behind this stunt was to combat price volatility by implementing a smart contract on the Ethereum platform to deflate the token supply by one percent of each transaction. The initial total supply of the Bomb Token was one million tokens. With very little historical data pertaining to their experiment that could foresee how the market would impact their deflationary token, they released Bomb Token to the public by airdropping to users who provided their wallet keys. As time progressed, the creators took to marketing, developing their own website, and developing the story of Bomb Token. Bomb is projected to deplete completely around 2034.

3.1.2 *Other Examples*

Another Ethereum-based token that is similar to Bomb is the Nuke Token, which raises the deflation rate to 2%. Unlike BOMB, NUKE will stop burning its token at a certain point, theoretically in 2036. The creators of NUKE called their coin the "first deflationary currency with utility" and wanted to provide users with more real world applications for daily usage and money transfer. The NUKE development team also plans to create DEX and DApps to prove it. Another popular coin of this kind is the Void Token, which is a TRON-based token that increases the burn rate to 3% per transaction.

Last but not least, Optitoken (OPTI) is another Etherum-based ERC-20 token but OPTI's burning mechanism is quite unique. The team behind OPTI invests their assets in another portfolio, then uses the profit to buy back OPTI token and transfer them to an unspendable address to make them disappear from the ecosystem.

3.2 Stablecoins

Bitcoin and Ethereum usually see a wide price fluctuation of around 10~20% percent daily, sometimes up to 300%, which prohibits people from using them for general purposes and daily purchases. Stablecoins emerged by offering users the best of both worlds: the convenience of instant processing and the security of cryptocurrencies. Stablecoins are defined as cryptocurrencies that are designed to minimize the volatility of the price of the stablecoin, relative to other stable assets or basket of assets. There are two kinds of stable coins: asset-collateralized and non-collateralized. Asset-collateralized coins are pegged to fiat currency, such as USD or gold, thus they provide users with price stability while compromising centralization and dependence on regulation, requiring trust from users and financial audits from third parties. Non-collateralized coins offer full decentralization and independence from any other currencies but can be complex to build and require constant supervision via smart contracts.

4 ANALYSIS ON DEFLATION: BOMB

In order to decide our deflation rate, we drew Bomb Token's price data and analyzed the effect that a 1% burn rate had. According to Figure 1 below, BOMB's price has experienced a 2200% price spike starting late May 2019 and lasted approximately 28 days. It was interesting to see how the public would

trade their tokens knowing that 1% of their tokens will burn. It doesn't seem like the burning supply has deterred people from cashing out during its peak, which doesn't come as a surprise. But we strongly believe that the token is on an uptrend. The value has been established; the public has deemed it a commodity and are aware that not only is it limited, but it grows scarcer every trade.

Figure 1—BOMB's value vs time graph. Source: World Coin Index.

Even though volatility can be dangerous for an asset, if no good volume of tokens are traded on a relative basis, then there is no market for that token. We anticipate the most trading to occur near the end of Bomb Token's life. We suspect that the price will be the most volatile during that period as demand will increase as supply decreases resulting in high equilibrium prices as the token supply approaches zero.

5 STRUCTURE OF SPARK

We decided to enter the world of cryptocurrency with a tried and tested method, which is why we modeled our coin after Bomb. However, running an experiment with the same variables can be rather repetitive, so we tweaked the burn rate by a percent more to two percent. In addition, Bomb Token is forecasted to deplete in about 17 years, so a greater burn rate would accelerate the depletion and allow faster observation of effects over the shorter time period. We held the initial total supply at one million to compare how a differing burn rate affects the stability of price. Unlike the Nuke Token, Spark will indefinitely burn its tokens until it completely depletes.

The Spark token contract is deployed on the Tezos blockchain, and the token contract is written in Michelson. Michelson is a low-level stack-based functional programming language for Tezos. We employed the template from MiniTez by Claude Barde, a minimalistic token that solely executes transactions. With a parameter taking recipient's address and transferred amount and initial storage containing the ledger of addresses mapped to balances and total supply, the contract begins by verifying that the sender has not sent any XTZ to it to prevent XTZ from getting locked in contracts (Barde 2020). Then, it updates the sender and recipient's balances accordingly. The contract will fail if the sender does not exist in the ledger. If the recipient does not exist in the ledger, the corresponding entry will be created in it. While updating the balances, two percent of the transferred amount is burned, and the total supply is also updated accordingly. The total supply is always the sum of balances in the ledger.

As of right now, Spark Token is merely an experiment. Through a Reddit thread, we plan to distribute a fixed amount to users via airdropping. Since we cannot anticipate the average trading volume, we cannot forecast when Spark's supply will deplete to zero. It is also unclear whether Spark can gain as much traction as Bomb. However, given that trading stays rather active, we anticipate the supply to deplete by late 2020s in respect to the Bomb token's projection. Moreover, users are likely to hold on to the tokens, so the chances are the token supply will never deplete completely.

5.1 Benefits of Tezos

Because smart contracts are written in Michelson, a functional programming language, smart contracts on Tezos can be considered accurate in comparison to Ethereum's counterpart, Solidity. Object-Oriented programming languages such as Solidity are more vulnerable to the issues of Turing-Complete languages as pointed out by the Bitcoin whitepaper. Furthermore, in future, it is possible to confirm the correctness of smart contracts on Tezos because it facilitates formal verification. This could help convince new users to invest into the Tezos token markets by ensuring them that the tokens are not vulnerable to potential attack vectors.

6 CONCLUSION

To summarize Spark's main features, Spark is a token on the Tezos platform, released to the public with an initial supply of 1,000,000 sparks and a burn rate of

2% per transaction. Our objective is to observe the effects of deflation and burn rate on price stability and whether it can help to curtail the volume of volatility even by a decent extent. Furthermore, it should be notable to observe how tokens running on different blockchains affect volatility.

7 REFERENCES

1. "BOMB (BOMB) Price, Marketcap, Chart, and Info." CoinGecko. Accessed August 1, 2020. https://www.coingecko.com/en/coins/bomb.
2. Barde, Claude. "MiniTez: a Minimalistic Token on Tezos." Medium. Coinmonks, July 22, 2020. https://medium.com/coinmonks/minitez-a-minimalistic-token-on-tezos-f77e8c0f7a97.
3. "Bitcoin History – Price since 2009 to 2019, BTC Charts." BitcoinWiki. BitcoinWiki, May 6, 2020. https://en.bitcoinwiki.org/wiki/Bitcoin_history.
4. Buterin, Vitalik. "Ethereum Whitepaper." ethereum.org, 2013. https://ethereum.org/en/whitepaper/.
5. CoinGeek. "What Is A Deflationary Cryptocurrency And Its Advantages?" Medium. Medium, November 25, 2019. https://medium.com/@coingeek/what-is-a-deflationary-cryptocurrency-and-its-advantages-99420fc05a59.
6. Dalton, Mike. "Deflationary Coins: Can These Tokens Explode In Price, Or Just Burn Out?" Crypto Briefing, July 24, 2019. https://cryptobriefing.com/deflationary-coins-bomb-explode-fizzle/.
7. Dash, Zachary. "14 Things We Learned Creating a Million Dollar Hyperdeflationary Currency." Medium. September 16, 2019. https://medium.com/swlh/14-things-we-learned-creating-a-million-dollar-hyperdeflationary-currency-f372b270469c.
8. "ERC20 White Paper." ERC20 Token. https://erc20.tech/erc20token-whitepaper.
9. Ecurrencyhodler. "Deflationary Currency, Bitcoin, and Just a Store of Value?" Medium. July 19, 2018. https://medium.com/@ecurrencyhodler/deflationary-economics-bitcoin-and-just-a-store-of-value-70c4078abd85.
10. Prasanna. "BOMB: The Self-destructing Currency Realizes Market Cap of $11 Million." CryptoTicker. June 17, 2019. https://cryptoticker.io/en/bomb-11-million/.

11. ProtoFire.io. "Tezos (Part 5): Token Standards." Medium. May 15, 2020. https://medium.com/protofire-blog/tezos-part-5-token-standards-28b8733a3ce5.
12. Schulz, Philipp. "Buyback-and-burn: How It Works and Why It's Effective." Medium. March 22, 2019. https://medium.com/invao/buyback-and-burn-how-it-works-and-why-its-effective-cb2c7d9b9297.
13. "Self-Destructing Currency." BOMB. https://bombtoken.com/.