Financial Derivatives on the Blockchain or How to Stabilise a Crypto Currency A Literature Survey

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***Abstract*—This is the abstract.**

It is not done yet

***Index Terms*—Stablecoin; Blockchain; Cryptocurrencies**

I. Introduction

Cryptocurrencies have so far been notoriously volatile in price. The price of the largest coins have traditionally been susceptible to changes in both supply and demand. Making the assets unsuited for both investments in the long term, and payments in the short term.

As a result of these problems with the first cryptocurrencies of the world, many new coins have popped up that aim to fill the demand of a digital currency that has both the fast and secure payment features of traditional cryptocurrencies and the price stability of the currencies of the old world.

A current need for these currencies exists on crypto exchanges. When the crypto-markets have a decrease in price, the entire market tends to do so. In this case traders want to move their assets out of the volatile digital assets and into traditional currencies like the Dollar. However these transactions are limited by the speed of the old payment networks. A coin that is stable with respect to the US Dollar would solve this problem by allowing traders to change positions between the Dollar and crypto currencies.

As of the writing this survey, the 5th largest cryptocurrency by market cap is a stablecoin called Tether [1]. Tether is a cryptocurrency that though successful is doused in controversy with criticism leveled at their centralised infrastructure.

With the proven success of Tether, many cryptocurrencies have followed, some solving problems of those who have come before. MakerDAOs DAI [2], currently the 5th biggest stablecoin and the 57th biggest cryptocurrency with a market cap of 93 million USD, aims to be a fully decentralised stablecoin that maintains a value of 1 USD.

In this survey we aim to show a history of the significant stablecoins invented so far, and to classify and generalise of the techniques that are common among them.

First we discuss the topic of the purpose of money, the meaning of value and stability, and some currency pegs used in our traditional monetary system in Chapter 2. We then describe the simplest and most successful stablecoins, namely the centralised coins in Chapter 3. In Chapter 4 we go into the more complex topic of decentralised stablecoins and their methods for maintaning pegs without a central party guaranteeing the peg. We then go deeper into the theory in Chapter 5 where we look at the research into the viability of stablecoins. We then end with a discussion of the research on stablecoins in Chapter 6 and a conclusion of the survey in Chapter 7.

II. A Brief History of Currency Stabilisation

TODO

A. The purpose of money,

TODO

B. The meaning of value and stability,

TODO

C. Making a market

Collateralization (Pegging to Stable currencies)

The most common way to stabilise a currency is to hold some form of collateral. This stabilises the price of the currency by allowing holders of the currency to always buy and sell at a set price. Traditionally pegs of a currency to either gold or another currency have been controlled by a regulating authority holding a reserve of the underlying asset.

TODO

III. Stabilisation by Centralisation

Maintaining a stable price is hard to generalise and thus the simplest way to create a stable currency is to simply have an organisation guarantee that it is. Where the US Dollar is guaranteed to be stable by the Federal Reserve increasing and decreasing supply to match the demand, centralised stablecoins tend to do something similar.

A. Stabilised by reputation

A mostly theoretical way of creating a stablecoin is to simply promise as an organisation that your coin is going to be stable. This is the presumably the approach taken by JPMorgan Coin [3] and Libra [4]. Whereas JPMorgan Coin, aims to provide fast inter-organisation value transfer backed by JPMorgan as a traditional financial product with a digital spin, Libra aims to be a replacement for traditional fiat currencies while not being backed by any type of collateral.

B. Pegged by currency reserves

Since stabilisation by reputation is often not good enough for investors looking for a safe way to store their value a more secure stablecoin is needed. The simplest way to do this is to simply peg the cryptocurrency to another currency by guaranteeing a 1:1 exchange rate while holding enough collateral in order to do so.

The most successful currency to do so and the 5th largest cryptocurrency as of writing this survey is Tether [1]. Tether maintains a 1:1 peg to the US dollar by simply issuing 1 Tether for every Dollar payed to them. They hold the USD and will at any time buy the Tether back at 1 Dollar price. This intensives the 1:1 peg outside of the official Tether exchange as well as any investor able to buy Tether at under a Dollar can immediately sell it to the Tether organisation for profit thus reducing supply on the open market when demand drops. On the other hand, an investor able to sell a Tether for over a dollar can make a profit by buying newly minted Tether thus increasing supply when demand increases.

As mentioned, Tether is currently the largest stablecoin, however its centralised reserves draw controversy that reduces investor trust. An improvement on this concept is to have multiple holders of the currency with frequent audits to increase trust in the organisations that are making the market. TrueUSD [5] holds collateral in multiple escrows and is audited by third party as a result they used to be 2nd largest coin before being overtaken by USD Coin (USDC). USDC is a USD pegged stablecoin created by CENTRE [6] a joint venture of the exchanges Coinbase and Circle which also holds their collateral in multiple audited accounts.

The next level of trust that a stablecoin can guarantee comes from the government. PAXos [7], though having centralised reserves, is licensed and approved by New York State Department of Financial Services and has secured FDIC-insurance. This has won the favor of investors as they are now the 3rd largest stablecoin after Tether and Centre.

The largest current Euro coin is the Stasis euro [8]. It represents over 31 million euros currently and has maintained its peg since its launch in December 2018. Stasis has built a network of liquidity providers and is thus not the market maker themselves.

C. Pegged by assets

Essentially, a centralised currency pegged stablecoin is just a tokenised asset. This can be taken further than just currencies. Using tokenisation it is possible to peg the value of a crypto coin to anything.

Digix Gold Token (DGX) [9] pegs its stablecoin to the value of an ounce of gold. DGX is thus a cryptocurrency on the gold standard. However with the tracking of real world assets comes centralisation. DigixDAO, the organisation that manages DGX, stores its gold in a single vault in Singapore.

When the goal is to have a stable currency the dollar is not necessarily the best option as it is tied to the economy of the United States. Globcoin [10] and x8currency [11] aim to solve this by creating an asset that tracks multiple currencies as well as gold.

D. Pegged by other centralised stablecoins

In order to peg perfectly to a currency that currency needs to be regained from the stablecoin at any time. This requires the storage of the coin by some party. In all stablecoins so far, this is relatively centralised. Even coins splitting their coins across multiple escrowed accounts are subject to centralised fraud.

As a result coins are being developed that try to diversify the collateral. Reserve [12] aims to collateralize using USDC, TUSD, PAX. They aim to go through multiple phases with a final state where they are no longer pegged to the Dollar at all but a stable currency in itself.

E. Theory

Fedcoin_Central_Bank_R3.pdf [13]

IV. Stabilised while Decentralised

A. Collateralized

1) Dependencies: Chainlink oracle [14]

[15]

2) Development over time: BitShares [16] bitusd is a token for speculating on bitshares uses CDP like structure

MakerDAO [2] DAO, pegged to dollar, CDP accepting ether, plans to add Digix gold CDPs, gets margin called when under collateralized, governance token is printed and sold as last resort

Havven [17] generalises stablecoin to tracking of offchain trackers, now synthetix, hold singe collatoral pool of "SNX", allows exchanes between any tracked asset

[18]

3) TODO Fit into the story: EOSDT

4) Domain Specific: [19]

Steem dollar Steem-dollars are used for storing proceeds on the steemit network, redeemable for 1 dollar worth of newly minted STEEM with a weeks delay

B. Algorithmic

1) Theory: Stabilising is not pegging...

Changing parameters to make the currecy respond dynamically to price changes...
a) Indicators of price changes: Supply:

Hash rate
b) Indicators of price changes: Demand:

Transaction fees
c) TODO::

[20]

How to make a digital currency on a blockchain stable

- Argues that the way newly created currency is unlinked to the supply and demand leads to uneccessary instability.
- Mining rate increases and decreases with demand and thus price
  - Mining reward should go up when mining rate increases
  - Mining reward should go down when mining rate decreases.
  - This is done by not resetting the block time to 10 minutes unless a minimum/maximum threshold is reached.
  - When the threshold blocktime is reached the reward for the block should simply be scaled with the mining difficulty.
- The author also suggests no halving in mining reward
- To cull inflation the author suggests a mechanism for deflation
  - every 100 blocks all bitcoins are depreciated in value by deleting a percentage of them

2) Practice:
a) TODO::

[21] [22] [23] [24] [25]

Nubits First Stablecoin to be stable for a year, incetivises holders to park currency during low demand, Democratic DAO, failed after a demand shock in 2016, recovered, failed again, never recovered again

Ampleforth Formerly fragments, Scales existing coins in place to make 1 equal to a dollar, rebase happens at most every 24 hours

Anchor Pegs to "Global Economic Growth" with MMU oracle (Monetary Measurement Unit). Uses Seigniorage Shares Model

Basis decentralised, defunct, brings up interesting faults of makerdao and bitshares was based on Seigniorage Shares Model

BitBay peg needed for trading platform, maintains rollong peg by freezing users coins

V. General theory

A. hm

[26] [27] [28] [29] [30] [31] [32] [33] [34] [35] [36]

- Are Stable Coins Stable?
- DuffieDigital and Fast Payment Systems
- Money as IOUs in Social Trust Networks
- Can We Stabilize the Price of a Cryptocurrency?: Understanding the Design of Bitcoin and Its Potential to Compete with Central Bank Money
- TrustChain
- THE STATE OF STABLECOINS
- Stablecoins in Cryptoeconomics. From Initial Coin Offerings (ICOs) to Central Bank Digital Currencies (CBDCs)
- Stablecoin: Yet Another Layer of Cryptocurrency Complexity
- (In)stability for the Blockchain: Deleveraging Spirals and Stablecoin Attacks
- Elasticoin: Low-Volatility PoSW
- Designing Stable Coins

VI. Coins to investigate

[37] [38] [39] [40]

- minex
- carbon
- augmint
- AuroraDAO

VII. Discussion

A. Centralisation

B. Decentralisation

1) Complexity and Ease of Use:
2) Reliance on pricefeeds:

C. Attacks

1) George Soros:

D. Trading risk without Centralisation

VIII. Conclusion

This is a citation **???**.

IX. Future research

A. Crypto derivatives

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